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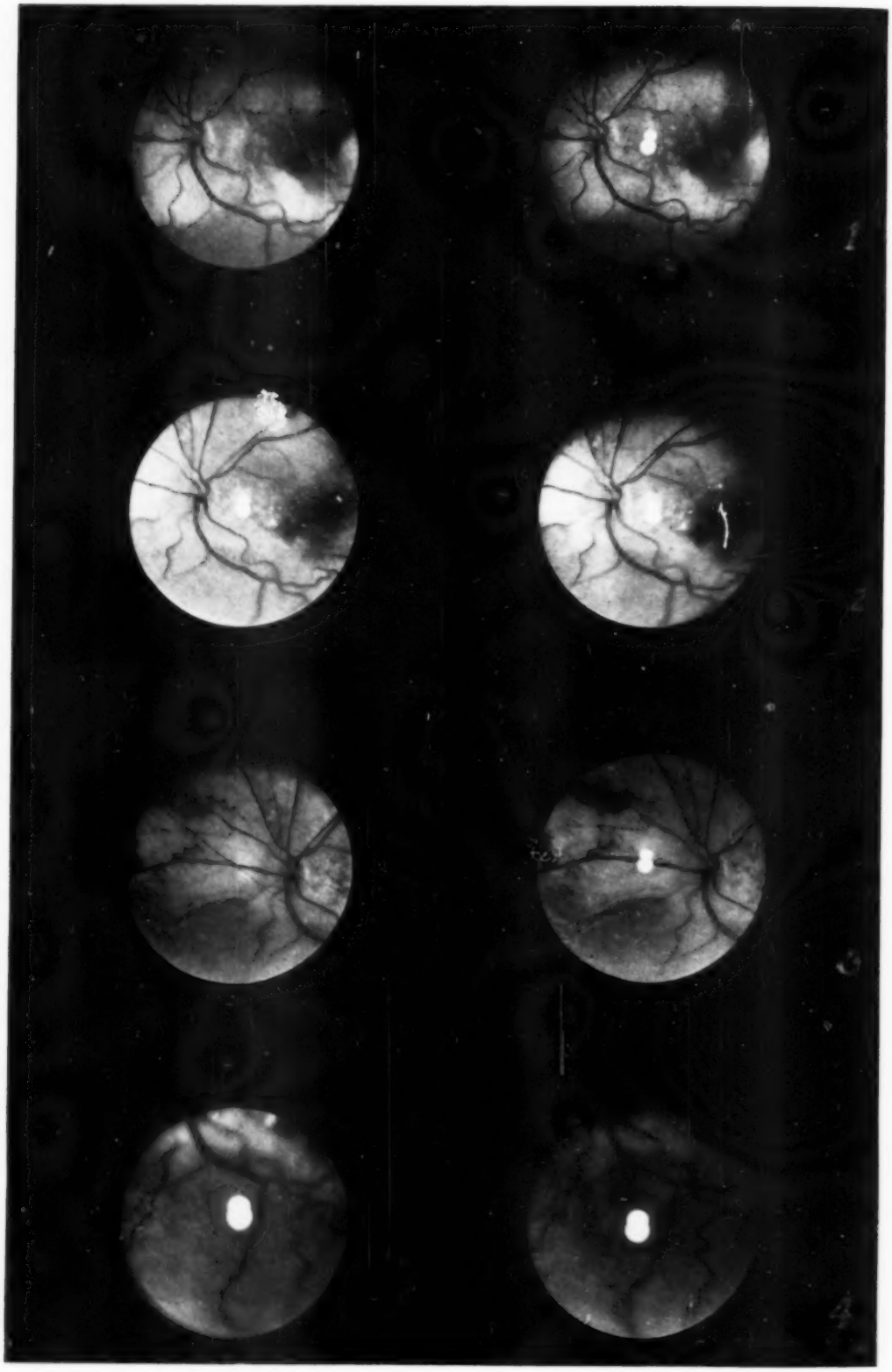

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AMERICAN JOURNAL OF OPHTHALMOLOGY
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ANGIOMATOSIS RETINÆ

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ALBANY, NEW YORK

The three cases reported in detail, and whose progress is portrayed by means of fundus photographs, are illustrative of various types of this interesting disease. Cases in the previous literature are summarized, and a bibliography is appended. Presented, in part, before the Medical Society of the State of New York, June, 1930.

As far as the literature shows, angiomatosis retinæ has been reported less than one hundred times. In some cases it is associated with widespread cystic degeneration in other organs, particularly the brain. When so combined the cerebral symptoms may be the dominant ones and the ocular signs may be overlooked, especially if a skilled ophthalmoscopist is not consulted. The characteristic ocular lesions are located most frequently in the extreme fundus periphery and may therefore be unobserved. Then, too, the significance of the vessel changes are not recognized by all.

Clinically there are three distinctive types: one with immense venous enlargement and fullness of the paralleling artery; another with whipcord artery and widened, straight vein; and a third with swollen, rounded, elevated nerve head suggesting a choked disc. In the first type exudate appears comparatively late, whereas in the second type it is one of the early signs. All forms eventually look almost alike. The disease has been recognized in all ages from early childhood to middle life, but perhaps it is most commonly found in the third decade. Either eye may be involved in the unilateral cases; in the bilateral cases primary invasion is not more common in one eye than the other. In the three cases here reported two were unilateral; one was in the right eye, the other in the left. The third was bilateral, starting in the left eye. These cases have not come to pathological examination.

From the study of the literature and our cases the earliest photographic sign is a fullness of the retinal veins, as though a constricting band impeded the venous outflow. Following this an edema of the retina develops; and we find greater compression of both arteries and veins with subretinal flecks of exudate which soon become subretinal sheets. In some a macular star is formed. At about the time when great layers of exudate form, angiomata are discovered far in the retinal periphery, most often on the temporal side. Partial detachments of the retina may precede these or both may develop at the same time. Complete detachment with secondary glaucoma usually follows. The exudate is found to lie beneath the vessels, although, as we have shown

PLATE 3, CASE 1. ANGIOMATOSIS RETINÆ (BEDELL). (STEREOSCOPIC PHOTOGRAPHS.)

Fig. 1, (November 28, 1928) The disc outline is suggested by the white crescent on the temporal side. Broad inferior vein and whip-lash artery. Mottled fundus. Tangled vessels over the macula.

Fig. 2, (January 25, 1929) Older exudate. Iridescent areas about the darkened macula. The tangle of vessels is easily seen.

Fig. 3, (January 25, 1929) The nasal side, showing the distribution of the exudate and the size of the vessels.

Fig. 4, (January 25, 1929) The lower portion of the fundus showing the wider veins, increased peripheral tortuosities, and retinal detachment in the lower portion.

photographically, veiling is possible. The exudate most often appears first on the temporal side. It varies in quantity, thickness, and color. There may be small, thin, yellowish flecks which disappear or the flecks may so increase as to form a thick white layer. This transformation is well illustrated in one case (M.L.), where the macular star offers an excellent field for detailed study.

The detachment of the retina may be an isolated small portion in the extreme periphery; a sector defect near the disc; a single, large, bulbous separation; or several detachments, which may give the impression of multilobular cysts. In the terminal stage the retina is completely detached.

The blood vessel changes cover a wide range of physical signs. Among the common findings are: irregular caliber, fusiform dilatation, beaded contour—almost rosarylike in degree, loops, kinks, spiral twists, and glomeruli. The veins seem to undergo the greater change, but in the far advanced cases all of the retinal vessels are involved.

Three cases are reported with photographic histories because they illustrate contrasting types of the disease.

Case 1: The first is that of a married woman of forty years, who had worn glasses for a short time twenty-four years ago and had then noticed that a spot, which looked like a crab, had come before her left eye. The vision had gradually decreased until for some time, probably years, she had been unable to see anything with it. She had never been seriously ill and as far as she knows no member of the family had had an ocular disease.

Our primary examination was made November 28, 1928. The right eye had vision of 20/20 and type 1, unimproved by correction. The pupil was 4 mm., regular, and active to light and accommodation. The media were clear. The disc was oval with a rounded and indefinitely outlined nasal edge. The temporal border was clearly distinguished as a pale arc. The arteries and veins were of normal size. The superior temporal branches followed an unusual course but were otherwise not noteworthy. The macular area was clearly defined with a prefoveal reflex.

The left eye was blind; externally it was negative except for a slightly irregular, oval pupil, the result of a posterior synechia at the lower outer border. Under homatropin the pupil dilated to 4 by 5 mm. There were a few isolated floating vitreous shreds. The disc was slightly oval and so completely surrounded by flocculent, white, subretinal exudate that its outline could only be determined by its white edge. There was no central excavation. The arteries and veins were of normal size and distribution, except the temporal branch of the lower vein; which was at least twice the size of the nasal division and was decidedly changed in caliber. The inferior temporal artery formed a whip-lash convolution as it proceeded peripherally. About three disc diameters from the temporal margin it made an angular bend and soon divided into two branches; an increase in tortuosity was noted from the point of bifurcation. A small branch from this artery twisted upward to enter a horizontally oval, elevated angioma in a grayish mass about one-half disc diameter in size. Two almost straight veins passed vertically downward from the gray tuft to enter the inferior temporal vein just distal to its bifurcation. From the su-

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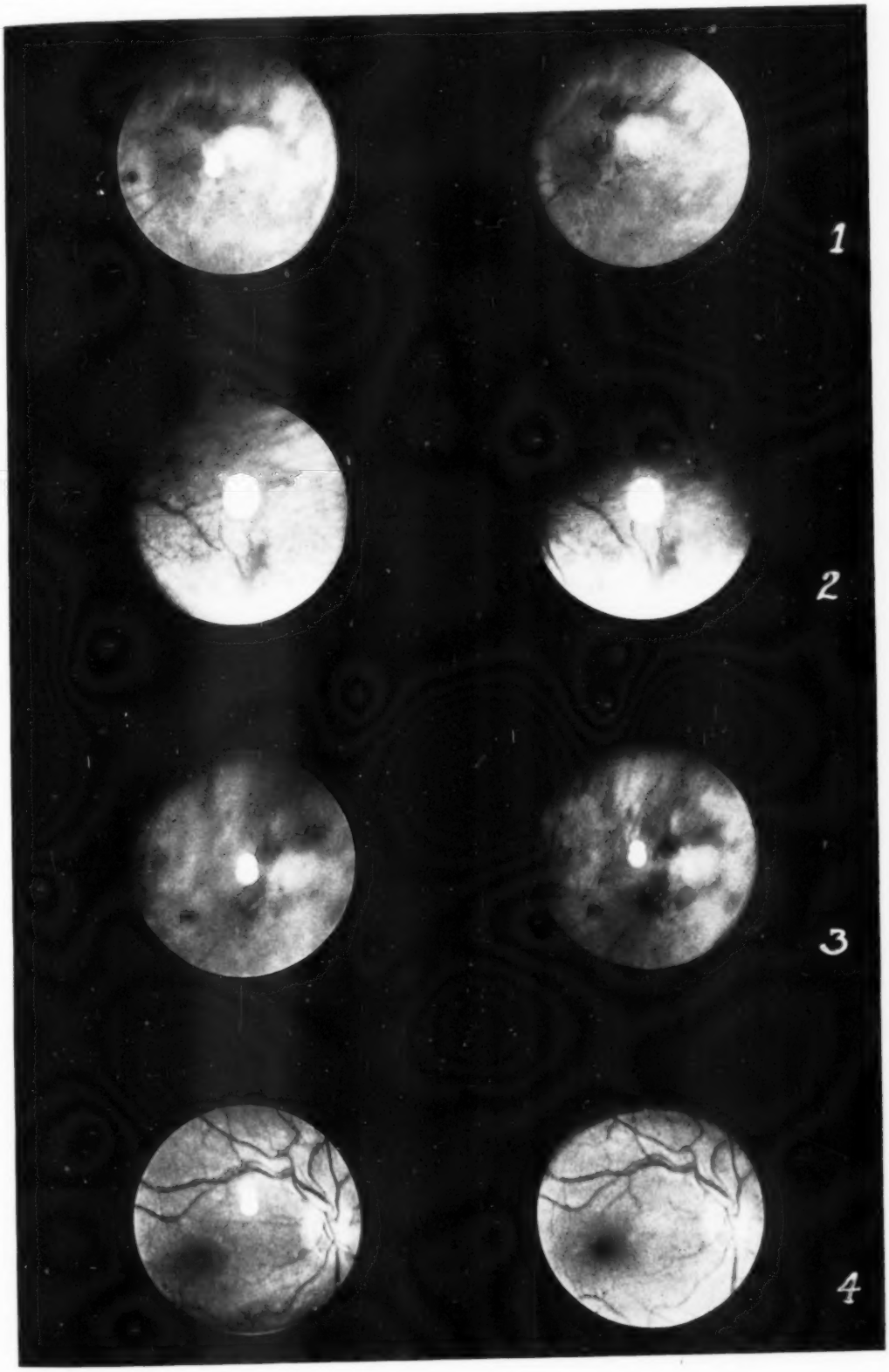
PLATE 4, CASE 1. ANGIOMATOSIS RETINÆ (BEDELL). (STEREOSCOPIC PHOTOGRAPHS.)

Fig. 1, (January 25, 1929) A typical angioma found at the temporal side. Fluffy white overlying mass, elevated darkened streak-like tumor with arteries and veins.

Fig. 2, (January 25, 1929) An irregular-shaped angioma. Arteries and veins can be distinguished by the depth of color.

Fig. 3, (February 6, 1929) The same angioma as in figure 1, showing the alterations that have taken place in twelve days.

Fig. 4, (February 14, 1929) Right eye. The disc is outlined, the nasal half a little elevated and a little obscured. No alteration in the vessels although the upper temporal ones follow an unusual course.



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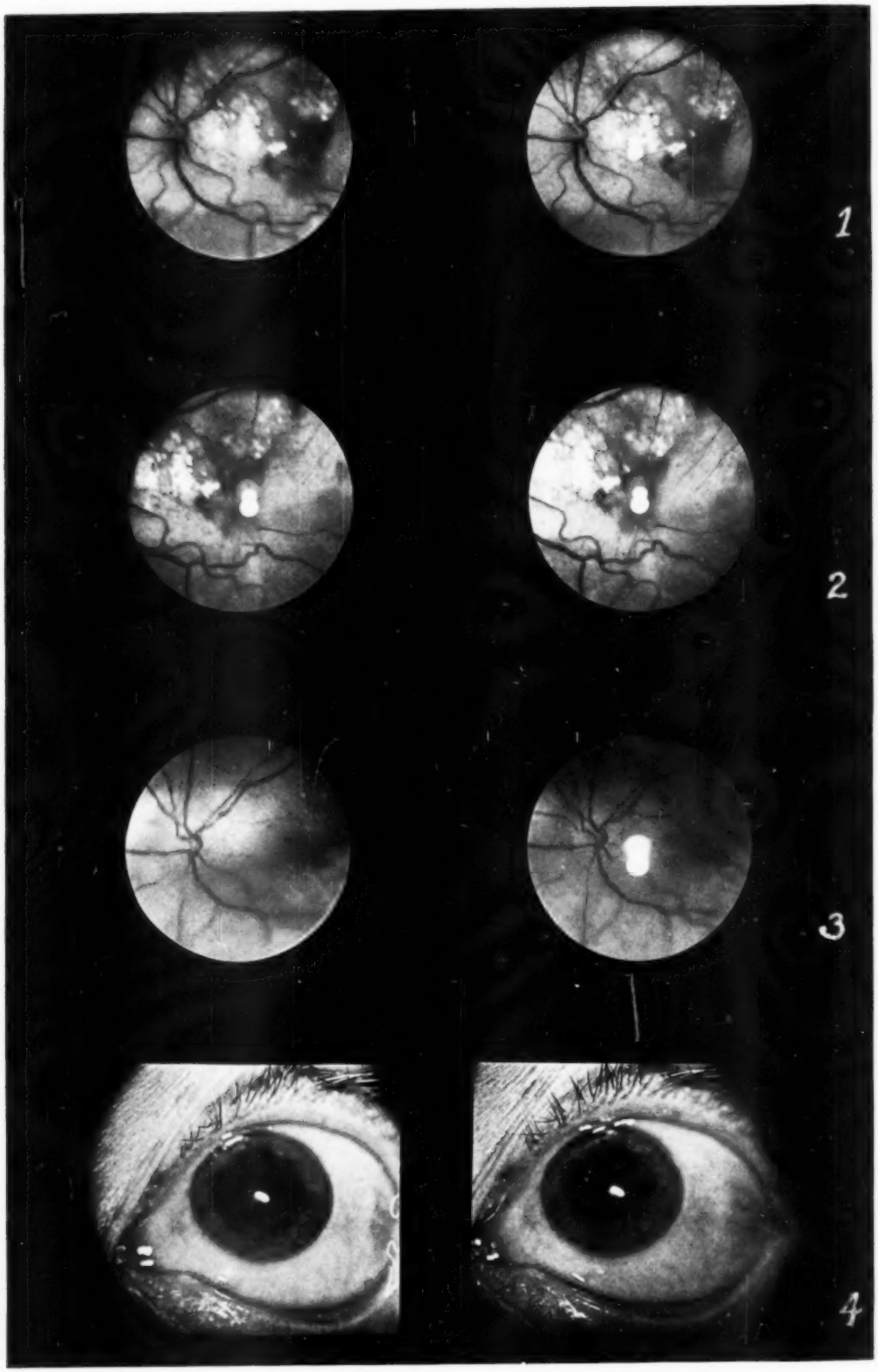

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perior temporal vessels several small branches converged toward the region of the oval angioma. The exudate consisted of many finely speckled, yellowish white, confluent masses which formed a definite sheet. This layer followed no definite outline and was often entirely lacking so that the dark choroid was visible in places. The contrast was especially evident to the temporal side of the macular area and in the region where the vascular degeneration was progressing. The peripheral portions of the fundus were not involved.

January 25, 1929: The retina in the lower outer quadrant has become detached. Beneath the detachment there is no thick white sheet but only an extremely fine, almost granular exudate. The changes between the macula and the disc are very striking: first, in the formation of large, glistening, refractile crystals and bright, white exudate; and second, in the dark red masses near the central angioma, best seen with a plus 14.00 diopter lens, and now found in the upper, outer part of the retina. The entering arteries and emptying veins are clearly distinguished. The background on which the vascular tumor is found is whitish gray and so opaque that the underlying choroid is not visible.

A change is taking place in the nasal side. This consists of a more mottled white sheet extending far into the periphery. Immediately contiguous to the disc it is less dense than two months ago. There are several white streaks suggesting in their outline exudate-encircled blood vessels. To the temporal side another angioma has developed. This is partially hidden by a white, posterior vitreous cloud. The angioma is made up of several dark, converging, red streaks; an elevated, irregularly oval center; and almost straight exit veins. Directly above one of the latter is another small, superficial vessel dilatation."

February 6, 1929: The angioma is less definite and the overlying cloud less dense and less fluffy. The neutral gray background remains the same.

March 3, 1929: The perimacular region is undergoing the greater changes as evidenced by two triangular areas containing many crystals and more white exudate. The remaining three-fifths of the part surrounding the fovea is a white sheet which is an almost flat detachment. There has been no appreciable change in the central angioma or in the telangiectatic region. It is more difficult to distinguish the disc from its surroundings because of the white background.

October 2, 1929: During the past six months the patient has wandered afield and has been told that she has tuberculosis, although all of her tests are negative. The entire fundus is an almost uniform gray and the retina is detached, but the dark areas about the macula can still be faintly distinguished.

November 7, 1929: The pupil can only be irregularly dilated because of four broad pigmented posterior synechiæ. At the pupillary border there is a slight uveal pigment ring. The iris structure is distinct, although it is paler than the other eye. Through the clear lens a few retinal vessels are seen with a plus 8.00 diopter lens. The view is limited, for the vitreous is filled with glistening crystals and tangled vitreous threads on which innumerable orange ovals are seen with the slit-lamp.

May 29, 1930: The right eye is still unchanged. The pupil of the left eye remains irregular with the same four adhesions. The nasal half of the retina is detached and seen best with a plus

PLATE 5, CASE 1. ANGIOMATOSIS RETINÆ (BEDELL). (STEREOSCOPIC PHOTOGRAPHS.)

Fig. 1, (March 29, 1929) An increase in the iridescent plaques, which show in the picture as the whitened areas. The exudate has changed, giving a mottled effect to the fundus.

Fig. 2, (March 29, 1929) A more peripheral view. The blood vessel changes in the lower part of the fundus are better shown by the irregular caliber of the vein and the whip-lash convolutions of the artery. Directly beneath the light the telangiectatic vessels are visible.

Fig. 3, (October 2, 1929) Detachment of the retina hides most of the underlying detail.

Fig. 4, (April 3, 1930) An external view showing the changes in the iris and posterior synechiæ.

16.00 D. lens. Under the slit-lamp the lens shagreen is well marked. The thickening of the lens capsule in the vicinity of the synechiæ is silvery gray. There is an iridescent, posterior cortical lens opacity and the vitreous threads are studded with pale, orange-colored flecks and patches. An occasional retinal vessel is seen through the clouds.

Case 2: Jones, in the American Journal of Ophthalmology for January, 1928, recorded a case of retinitis with massive exudates, and at that time presented a colored drawing made in 1927. The patient was a nine-year-old Italian boy, who had come to him December 27, 1926, with vision reduced to the perception of large objects. In the temporal region of the retina there was a yellowish white, wavy area which occupied almost the entire lower and outer quadrant. There were many flocculent or mutton fat patches. The retina seemed detached in the region of the inferior temporal artery.

Through the kindness of Dr. Jones, I was permitted to make several photographs of the fundus in January, 1929. By comparing the picture made in 1927 with the photographs made in 1929 the differences can be seen. My notes follow: An extensive, opaque white sheet surrounds the nerve head, widening out on each side in a form suggesting a horizontal figure 8. The upper edge consists of many flocculent bright spots. To the temporal side of the macula there are darkened areas, which are found to be dilated blood vessels, a real telangiectatic mass. The blood vessels of the disc protrude over the surface and a network of many fine branches lies over the region of the central excavation. Considerable glial proliferation obscures most of the disc outline, but a darkened oval defines its distinctive shape. The superior vessels, particularly the veins, are slightly fuller than normal. The lower temporal vein is decidedly widened and is crossed by the inferior temporal artery which bifurcates at the inferior disc edge. The upper division of this branch is wavy, and as it passes outward is raised over the elevated retina. The vein divides some distance from the disc and shows no increased tortuosity until it reaches the peripheral portions of the field. The nasal half of the fundus is sharply separated into two parts: the upper is a thick, white, homogeneous layer; and the lower, which begins about one disc diameter below the disc edge, is a retinal detachment. Through the pellucid retina we find granular yellowish white exudates along the lower edge of the white sheet, but beneath the detachment itself no detail is visible. A band of attached retina separates this detachment from the one referred to in the lower temporal quadrant. Far in the peripheral temporal field there is a large, fluffy, gray-white swelling which projects several diopters above the retinal surface, partially concealing an aneurismal mass into which an artery extends and from which a vein can be traced.

Dr. Jones wrote to me on the thirtieth of April, 1930, stating that the media were cloudy. More extensive detachment of the retina, many irregular glistening yellow spots, and several fine angiomas were present.

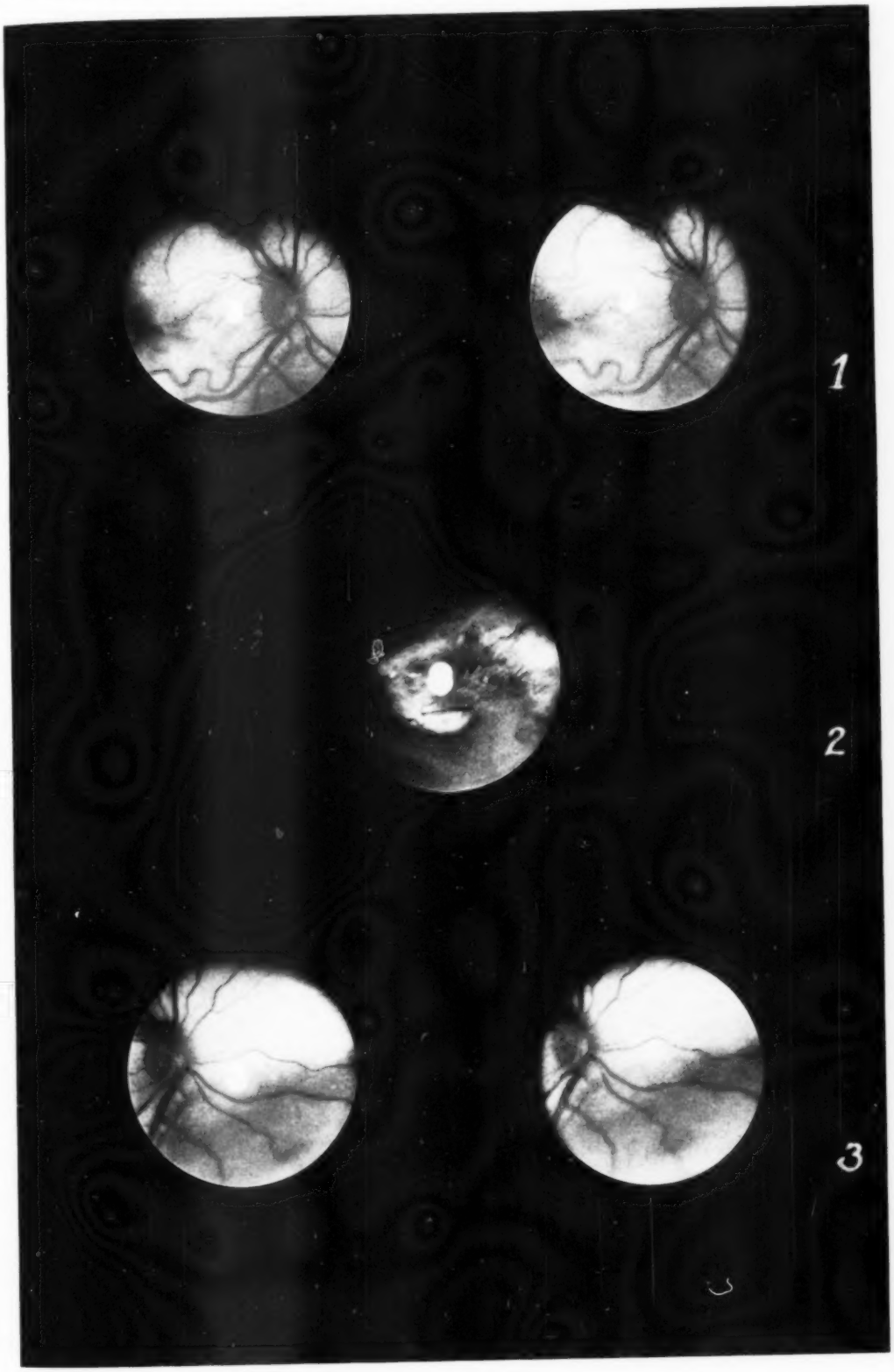
This case represents one which has been under observation for about three and one-half years. When first seen the vision was markedly reduced and the extensive subretinal exudate and moderate vessel changes were the dominant features. At the time of the last examination, degeneration was evidenced by a greater separation of the retina, more cholesterin crystals, and a greater number of angiomas.

PLATE 6, CASE 2. (ANGIOMATOSIS RETINÆ (BEDELL).

Fig. 1. This pair of photographs shows the extensive subretinal exudate, the very large inferior vein, and the whip-lash artery.

Fig. 2. A single photograph showing the vascularization of one of the angiomatous masses.

Fig. 3. Stereoscopic photographs showing the abrupt lower margin of the detached retina, with subretinal exudate.



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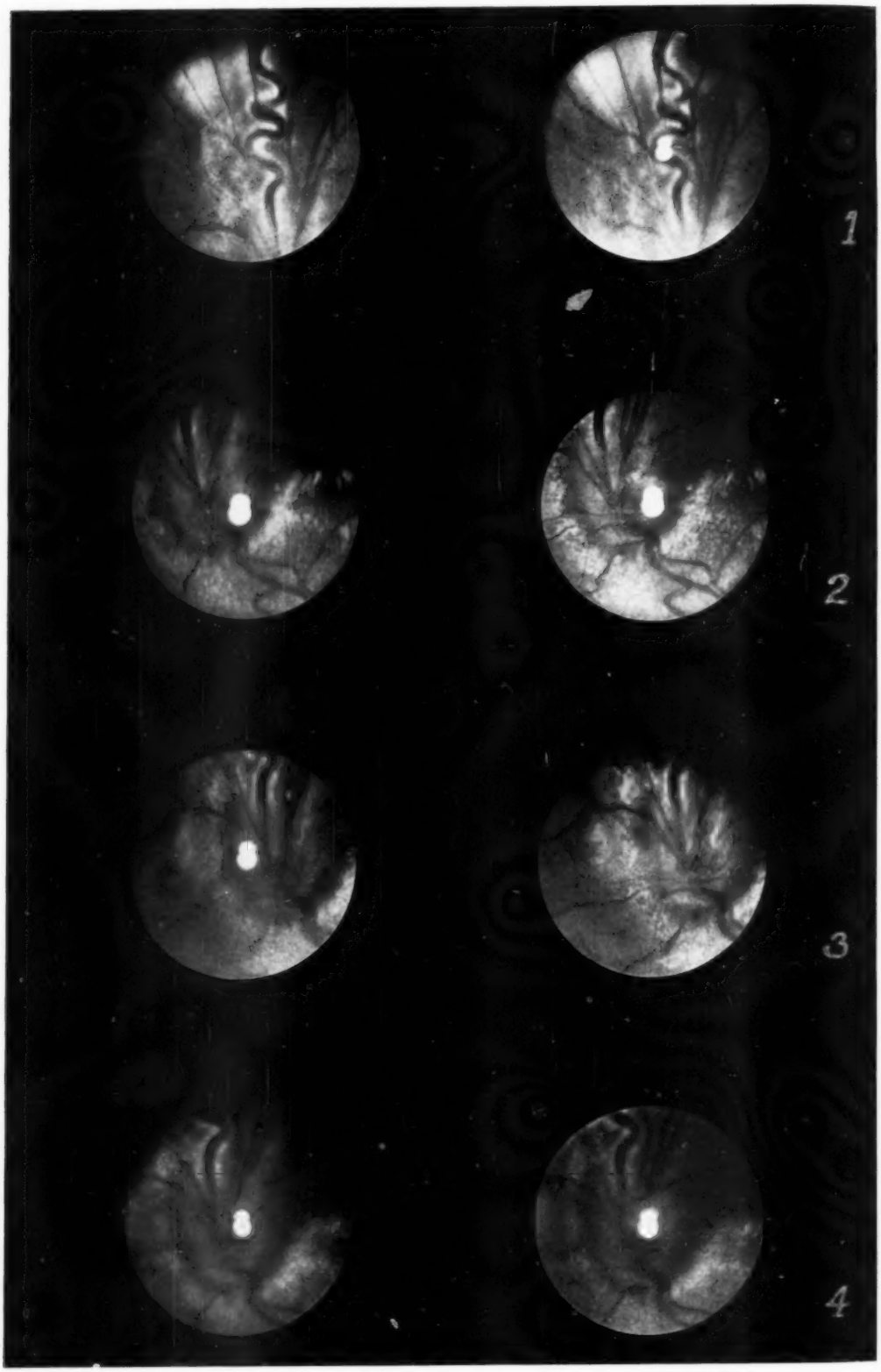

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Case 3: Our most interesting case, in many ways unique, is that of M. L., an eleven year old girl who was seen in consultation with the late Dr. A. M. Brown. On the twenty-sixth of October, 1928, she had consulted Dr. Brown "because of defective vision of the left eye." Dr. Brown reported that "the fundus presented the appearance of a well-advanced neuroretinitis. The Wassermann was negative. Except for a trace of albumin there was no pathologic change in the urine."

The family history was essentially negative with the exception of the possibility of angiomatosis in a grandmother, who died blind after a year's illness with some obscure cerebral symptoms.

The mother was examined by me on the twenty-first of April, 1917, when the vision of the right eye was light perception. The pupil was irregularly oval. The disc border was heavily pigmented and the vitreous was decidedly hazy; the tension was plus 2. The left eye pupil was 4.5 mm., regular and active. The media were clear and the fundus negative. She had diabetes but would not follow a diet.

She (the mother) was not seen again until the twenty-third of July, 1929, at which time the right eye showed the effect of her uncontrolled uveitis. The pupil was 3 mm. by 3.5 mm.; the nasal half of the iris was firmly adherent to the wrinkled lens capsule, and the temporal half was deeply pigmented. The secondary cataract was milky gray. In the left eye she had retinal changes associated with diabetes, presenting the common hemorrhages and exudate. A photograph of her fundus was made.

A nineteen year old sister has no fundus lesion and her vision is 20/20 in each eye.

The child, our patient, two and one-half years before she came under observation, had had a severe attack of left-sided mastoiditis. She had been seriously ill for four weeks. In February, 1928, she had another attack with a zygomatic abscess, causing a critical illness which lasted four weeks. Her tonsils and adenoids were removed in August, 1928.

She was carefully and thoroughly examined by her attending physician, Dr. B. E. Chapman, who found: no deviation of tongue, facial muscle reflexes intact, no tremor of fingers, pronation and supination normal, no Romberg, knee jerks normal, ankle jerks normal, no Babinski, no Oppenheim, plantar reflexes normal, thermic senses normal, cutaneous sense normal, strength of both hands equal and normal, and no sign of ataxia. Urinalysis was negative. Red blood cells, 4,000,000; white cells, 9,400. Differential count: red blood cells not remarkable, white blood cells 44% polynuclear neutrophiles, 2% polynuclear eosinophiles, 1% polynuclear basophiles, 3% endothelial leucocytes, 50% lymphocytes. During a five day period of observing her in a hospital, Dr. Chapman found a slight afternoon rise in temperature. The x-ray examinations failed to disclose any obnormality, intracranially or elsewhere.

At the time of my examination on November 15, 1928, I made these notes: Right eye vision 20/20. The pupil is 4 mm., regular, responding actively to light and accommodation. The media are clear. A tortuous, twisted mass of vessels comes from the nerve head. The veins are decidedly fuller and darker than the arteries. There are three branches from the vein, but as one subdivides shortly after leaving the disc it

PLATE 7, CASE 3. ANGIOMATOSIS RETINÆ (BEDELL). (STEREOSCOPIC PHOTOGRAPHS LEFT EYE.)

Fig. 1, (November 15, 1928) The immense dilatation of the corkscrew vein.

Fig. 2, (November 15, 1928) The rounded edge of the disc with the beginning of the large vessel shown in the upper picture. A triangular elevation of the retina in the upper right corner and spots of subretinal exudate.

Fig. 3, (November 15, 1928) Flattening of the nasal side of the disc, a change in the distribution and character of the exudate.

Fig. 4, (March 18, 1929) The wedge of elevated retina is seen above the arc image. There is less exudate.

looks as though there were four. The arteries by contrast are comparatively straight. The temporal side of the disc is dimly seen through the edematous retina. There is no central excavation. Several fine, tortuous vessels run from the major divisions toward the clear macular region. The blood vessels gradually taper from the disc toward the peripheral region, but the veins remain somewhat wider than the arteries as far as they can be traced. The veins are about four times their normal size, the arteries are also increased in diameter. In the outermost temporal portion of the fundus there is slight depigmentation in an area without particular form.

Left eye: vision light perception. The pupil is 4 mm., regular, active; media clear. There is no discernible outline of the disc, which is a large, grayish pink swelling elevated five or six diopters. This is shaped like an obliquely inverted horseshoe. The superior temporal portion merges into a broad, fan-shaped detachment of the retina. The swollen disc gives the impression of a decided choke, but close scrutiny shows that there is a ridge consisting of the elevated retina and the nerve head; the lower half rises abruptly from the retina, whereas the upper inner portion slopes into the retina and the temporal side fades into the detachment. Surrounding the lower two-fifths of the nerve head is a ring of yellowish white, flocculent exudate, densest at the inferior border of the detachment, where it suggests in distribution the radiations often seen about the macula.

The blood vessels of the entire fundus are dilated and twisted. As they emerge and enter at the lower disc border, both the temporal vein and artery are decidedly overfull, with a brilliant reflex from the apex of the artery convolution. The vessels of the upper half are enormous, particularly the vein, which makes a double corkscrew turn as it passes almost vertically upward. The artery, at first in front of the temporal division and then behind it, gradually spreads out peripherally over the detachment. About four disc diameters above the disc is the beginning of the yellowish-white opaque sheet which lies beneath the retinal vessels, but which is so thick that the immense tortuosities of the vein dip into it and are partially concealed by it. The veins and arteries are almost of the same color but the bright reflex from the artery serves to distinguish it from the vein. There are no angiomatous swellings at the ends of the vessels. The detachment occupying the upper, outer quadrant is bluish gray and adherent to the underlying structures.

December 17, 1928: There is practically no change in the appearance of the right eye, with perhaps the possible exception of very slightly increased fullness in the lower temporal vessels, where the artery and vein are greatly distended and are almost the same color. Here again it is possible to distinguish the artery by the increased light reflex. Minute varicosities are found on the fine vessels between the disc and the macula. The artery subdivides into two branches, an upper and a lower. The lower one forms a loop, the high point of which is a brilliant reflex. The vein is also divided into two, the subdivision taking place in the structure of the nerve and beneath the artery.

The change in the left eye consists of a flattening of the nasal half of the nerve swelling, with an increase in the exudate as it lies along the vessels. It

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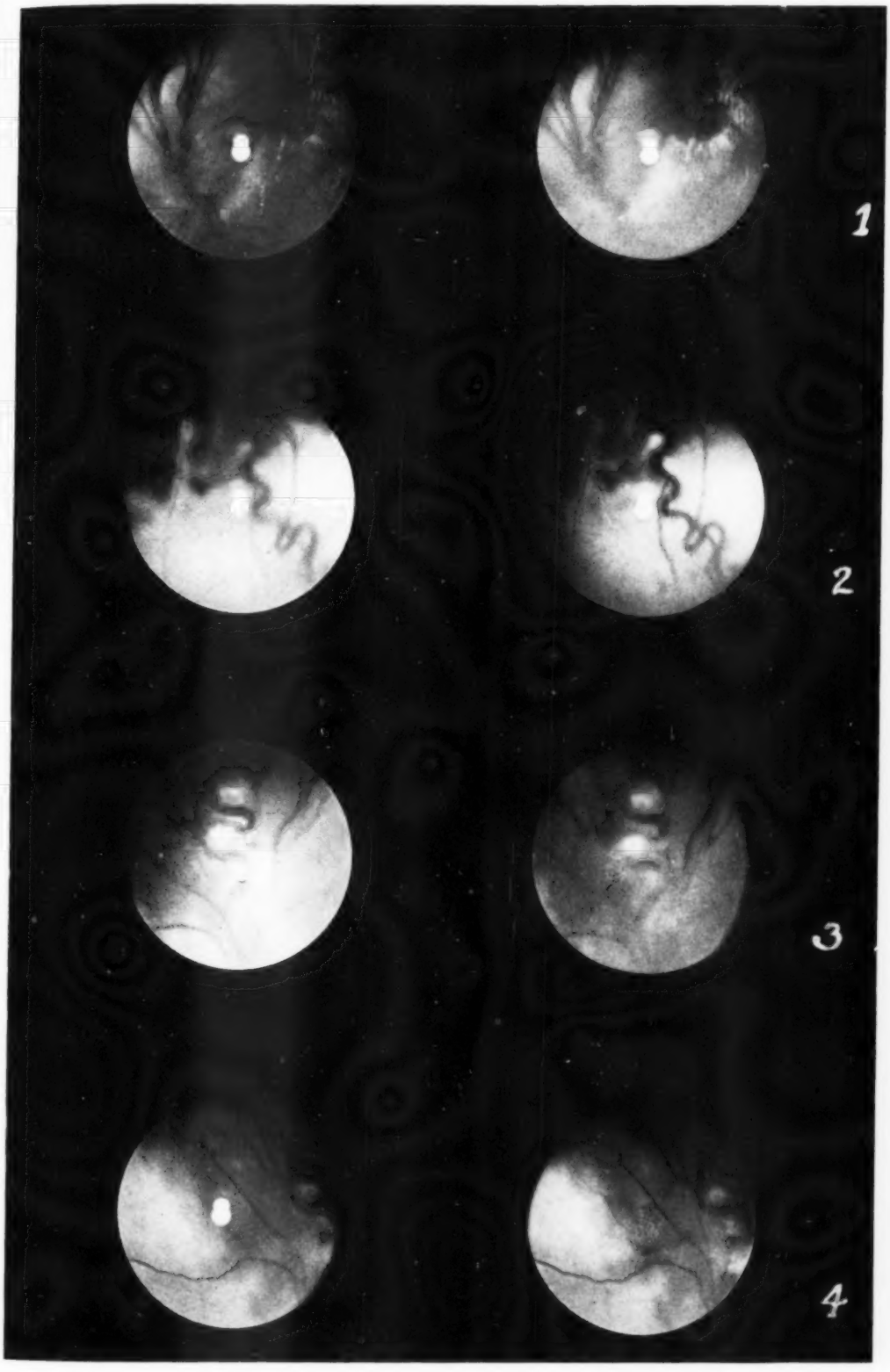
PLATE 8, CASE 3. ANGIOMATOSIS RETINÆ (BEDELL). (STEREOSCOPIC PHOTOGRAPHS LEFT EYE.)

Fig. 1, (March 18, 1929) A very great decrease in the retinal swelling, haziness of fundus detail, decreased exudate.

Fig. 2, (July 23, 1929) Dilatation in the increased tortuosity of the broad, inferior vein.

Fig. 3, (July 23, 1929) A view of the upper portion of the fundus showing change in the retina and altered tortuosities in the vessels.

Fig. 4, (October 12, 1929) Superior vein is partly obscured. A large sheet of subretinal exudate is developing.



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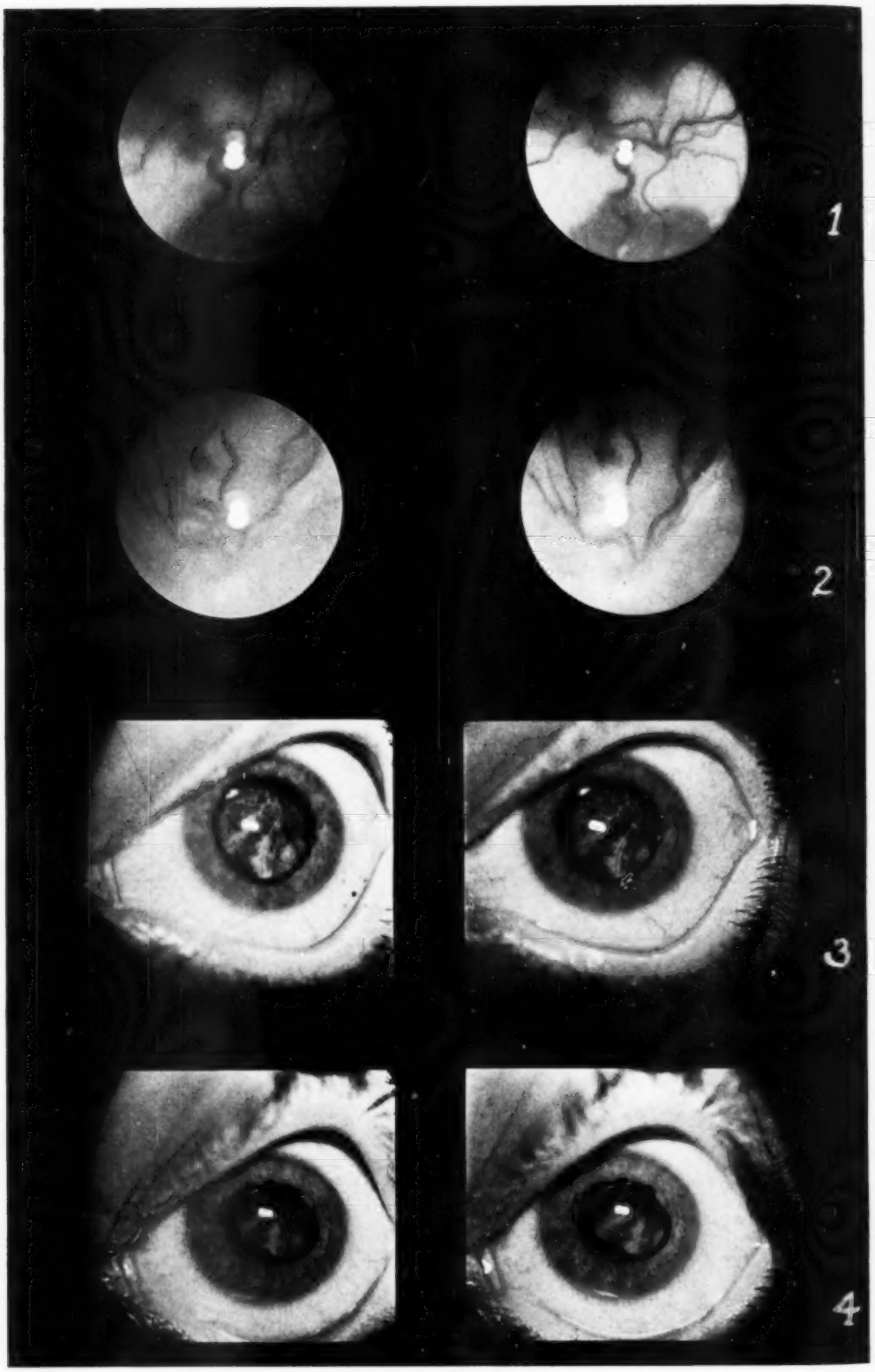

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is thinner about the disc. The superior temporal quadrant shows an increase in the retinal elevation. The exudate is less distinct in other parts of the fundus. There is a grayish hue over the entire background, which decreases the sharpness of outline and the clearness of the picture. The difference in level of the various portions of the region about the nerve head is very striking.

March 18, 1929: There is no perceptible change in the right eye. In the left the swelling of the nerve head has decreased. It has lost much of its pinkish color and now seems to be, with the exception of the temporal side, a part of a white opaque sheet. The finer splotches of exudate have disappeared except along the lower temporal edge of the disc and in the region which was characterized by the stellate exudate. In the latter place there are bright, yellowish white plaques."

May 11, 1929: Changes are taking place about the right nerve head. These consist of an increased edema of the retina; an increased fullness of the vessels, particularly of the veins; and a few lines of cloudy exudate. In the left eye, vitreous opacities are developing as shreds and tangled threads.

July 3, 1929: The right eye is the same. There is no change in the vision and practically none in the fundus. The left eye: The entire fundus is paler. The rounded mass of the disc is flatter, and corkscrew vessels have developed below the disc. The immense corkscrew vein in the upper part remains unaltered, but between many of the loops thick white exudate partially covers it. The lower portion of the field shows the newly developed, extremely large corkscrew vein with a mottled background of clear choroid and exudate. This exudate although widespread is often densest along the wall of some of the arteries.

October 12, 1929: There is still no gross change in the right eye. In the left eye the sheet of exudate continues to increase and in the periphery of the fundus we have for the first time distinct angiomata; the largest ones are in the course of the often mentioned superior corkscrew and on the detached retina near its highest point, which is about three disc diameters up and out. The fundus is now a slate gray color. There is a detachment of the retina in the lower outer field. Through the gray retina large white sheets of exudate are apparent. The veins and arteries often form tangled masses, along the course of which dark red angiomata are found. In the upper nasal field the gray sheet is easily distinguished beneath the uplifted retina. The picture shows the stage when multiple angiomata are found throughout the entire periphery and where the exudate layer is readily distinguished.

The patient did not return until the sixth of March, 1930. The following notes were then made:

The vision of the right eye is 20/100. The pupil is 4 mm., regular, and active. The media are clear. There is complete loss of the disc outline with great swelling of the entire retina; there are patches of exudate about the upper temporal vessels and there is a stellate group of whitish yellow streaks and discrete flecks in the macular region. There are separate deposits which come to the border of the inferior temporal artery and extend to a branch

PLATE 9, CASE 3. ANGIOMATOSIS RETINÆ (BEDELL). (STEREOSCOPIC PHOTOGRAPHS LEFT EYE.)

Fig. 1, (October 12, 1929) Another view of the superior portion of the fundus showing how the exudate has increased until now it is a homogeneous white layer over which the twisted distended vessels are easily traced.

Fig. 2, (October 12, 1929) The upper part of the fundus. Retinal degeneration has progressed so far that the immense corkscrews are almost completely submerged. The difference in level of the retina is well shown to the upper right side.

Fig. 3, (March 6, 1930) The retina has become detached. Three distinct cystic separations are easily seen. The exudate is found beneath the vessels and the immense inferior temporal vein is visible in part of its course.

Fig. 4, (March 24, 1930) Very great proliferation of uveal pigment layer, shallow anterior chamber, degenerated iris, lack of detail in the detached retina.

of the superior temporal artery. To the outer side of the macular star is a long, gray, white, tonguelike mass which extends into the vitreous, passing over the outer radiations of exudate. About seven disc diameters to the temporal side and slightly above the horizontal line is an oval retinal detachment to which an intricate blood vessel pattern extends. A tortuous vein swings down from above and enters an oval angioma from the side toward the disc but on a deeper level. An artery comes from above, passes horizontally from the blood tumor to enter at the top of what appears to be a cone. The detail of this dark, red mass is difficult to see and to portray, because the overlying retina is clouded. In this same part of the fundus are several small, reddish, oval dilatations. Some of these seem to be on the end of a vessel and look like very dark bluish cherries. In reality, a small artery can always be traced to each one and a vein found to come from each. The retinal detachment to the peripheral side of the largest angioma is limited to a narrow wedge, the upper side of which is whitish exudate; whereas the lower, less abrupt border merges into the clear retina. To the nasal side of the disc there is some increase in the cloudy edema with an occasional film over some of the vessels.

A great change is taking place in the vessels. The veins are immense with great snakelike convolutions and acute angulations. The arteries are much increased in size, but they are not very tortuous; although there is no beading there is sufficient variation in contour to be easily recognized. The arteries are a little paler than the veins and the arterial reflex is brighter. The light streak on the veins is very broad. Almost directly below the macular star is an obliquely placed angioma, and still lower a narrow artery compresses the vein and then projects into the vitreous; the artery has a bright spot reflex on its most anterior portion. All of the vessels in this region lie on the retina like stretched, red rubber balloons.

Left eye: The globe is white and the pupil dilates to about 7 mm. The iris is dull gray with a narrow dark brown uveal pigment border. The lens is clear. From the pupil there is a yellowish glare which comes from the complete detachment of the retina. There are three distinct lobulations in this separated retina. The largest one takes in most of the pupillary area. Another forms an angle in the upper temporal part, and the third is found in the triangle between the others. The surface of these rounded cystic swellings is covered with exudate, which is often arranged about the vessels, sometimes even seeming to follow their course. The variation in the size of the retinal vessels is very striking. In places they are reduced to mere threads, in others they become distended channels, often beaded and frequently having aneurismal dilatations. Over the edge of the small triangular detachment an immense tortuous vein is traced. The entire grayish yellow retina shows no tendency to float on motion of the globe. Under the slit-lamp the exudate is clearly demonstrated to be deep beneath the vessels which lie on the translucent retina.

March 24, 1930: The right eye is externally negative. The retina is par-

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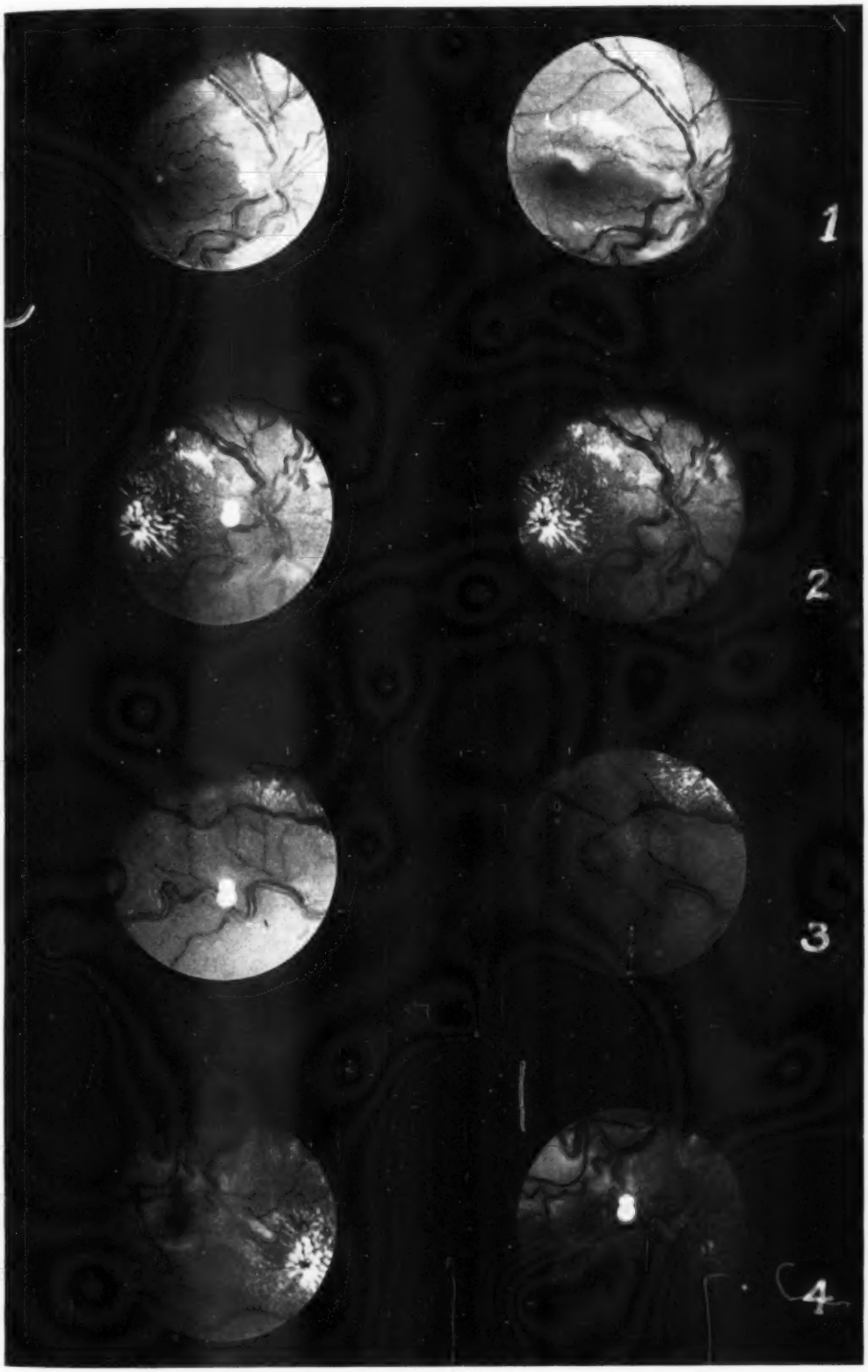
PLATE 10, CASE 3. ANGIOMATOSIS RETINÆ (BEDELL). (STEREOSCOPIC PHOTOGRAPHS RIGHT EYE.)

Fig. 1, (December 17, 1928) Almost completely obscured disc outline. Tortuous distended vessels.

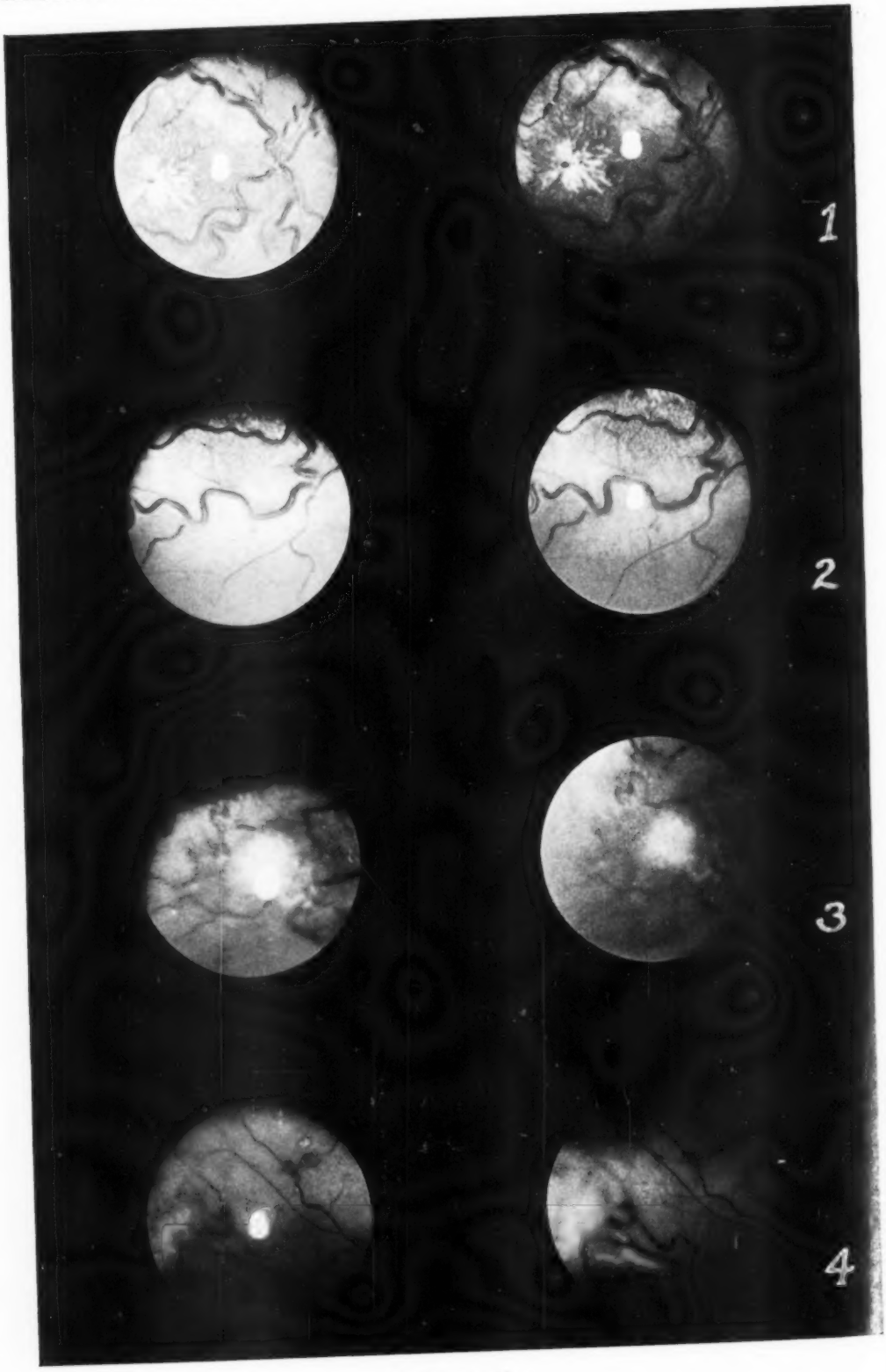
Fig. 2, (March 6, 1930) Complete loss of detail, whiter and more distended arteries and veins, macular star of exudate, and scattered exudate between macula and superior temporal vein.

Fig. 3, (March 6, 1930) The inferior outer temporal side showing the tortuous distended vein and the widened artery with the exudate reaching the margin of the upper vessel.

Fig. 4, (March 6, 1930) The more peripheral portion showing a flake of exudate lying to the upper, outer side of the macular star. A triangular detachment of the retina, very great distention of the veins, with a branch coming from the darkened angiomatous mass into which an artery can be traced. This angioma is to the left-hand side of the arc reflex, a smaller one is seen below it.



(SEE PAGE 402.)



(SEE PAGE 405.)

tially opaque, a lusterless gray without even a suggestion of a disc outline. In places the fundus seems mottled. This is caused by the contrast of dense exudate and less involved clearer retina. The macular star is much thicker but covers less surface. It projects into the vitreous, partially veiling some of the minor vessels. The layer of exudate which at the last examination came to the upper group of temporal vessels has now advanced beyond them and is so opaque that it covers part of the vessels in such a way as to give them a beaded appearance. This, of course, is not a caliber change but simply vessel obscuration. The dipping of the nasal vessels produces an exaggerated effect of tortuosity. The speckled layer of exudate which came to the inferior temporal artery now passes beyond the inferior temporal vein as a more uniform, wider sheet. All of the large vessels maintain their general course, but are more distended; many of the smaller branches are widened into linear, minute, red globes or large oval aneurisms, suggesting blood clots in color and form, although they are angiomata. These angiomata are widely disseminated. Some are in the immediate vicinity of the macular star, but the largest and most conspicuously characteristic lesions are in the temporal periphery. Two are especially noteworthy. There is one in the upper temporal quadrant, where a fluffy tuft of whitish cloudlike consistency lies over a dark red, indefinitely oval region into which somewhat straight arteries enter and very wide tortuous veins emerge. The other lesion is almost completely surrounded by twisted masses of large veins and arteries. Because of the difficulty in focusing, these distal growths are not clearly outlined.

In the left eye degeneration is progressing. The pale gray-blue iris is less definitely marked. The pupillary margin has a broad, uveal pigment ectropion of variable width. The pupil is oval, 4 by 6 mm., axis 165 degrees. The exudate which lies along the tortuous vessels is best seen through the clear lens with a plus 20.00 diopter lens. The details of the exudate distribution can be well studied with the slit-lamp. The retina is less lobulated than in the right eye, the tension is normal, and the globe is white.

June 12, 1930: Vision of the right eye 20/200. Pupil is 4 mm., slowly reacting to light. The media are clear. There is no suggestion of disc outline. The entire retina is edematous, with flecks of exudate scattered all about. A thick mass without stellate arrangement is near the macular region, and far to the temporal side there is a white subretinal sheet. The vessel changes are very marked. The disc is more blurred than when last examined and the veins are as large as those of the left eye when they were first seen. The superior temporal veins, i.e.—the immense ones, pass into the outer periphery where angiomatas have developed.

In the left eye the pigmented pupillary border is wider. There is no appreciable change in the vitreous and the same multilocular cystic detachment persists. Tension is plus one."

Since this note was made the patient has been under the observation of the gentleman to whom she was sent by me for an opinion. Unfortunately, he has failed to return her to me or even to

PLATE 11, CASE 3. ANGIOMATOSIS RETINÆ (BEDELL). (STEREOSCOPIC PHOTOGRAPHS RIGHT EYE.)

Fig. 1, (March 29, 1930) The retina is cloudier, exudate more extensive, distention of the vessels greater.

Fig. 2, (March 29, 1930) The scattered flecks of exudate have passed beyond the superior vessel and now reach the inferior. Distention and pallor of vessel greater.

Fig. 3, (March 29, 1930) An angioma in the temporal periphery showing as a fluffy, white, elevated mass into which the arteries enter and from which the veins pass. The darkened areas surrounding it are blood streaks.

Fig. 4, (March 29, 1930) The far temporal side. The vessels entering into an angioma, and in the upper right quadrant some less defined but positive small angiomata.

write regarding her progress, thus preventing complete pictorial record of this remarkable development.

A review of the numerous case histories cannot be made in the space available for this paper. There are, however, certain historical communications which should be read by all who wish to have a comprehensive knowledge of the disease.

The first experience of which we find record is that described by Fuchs as an arteriovenous aneurism of the retina. There was an immense dilatation of the artery and the corresponding vein, with a globular aneurism and some exudate.

The next case seems to have been the one described by Wood and presented before the Ophthalmological Society of the United Kingdom in 1892. There was an immense dilatation of the retinal vessels with bright colored veins and a detachment of the retina. The retina later became covered with white patches.

In 1894 and again in 1918 before the Ophthalmological Society of the United Kingdom, Treacher Collins demonstrated cases of bilateral multiple angiomata of the retina. Excellent drawings accompanied the presentations. He commented on the big tortuous vessels which passed into the raised masses of pinkish hue.

Hippel, in Graefe's Archiv for 1904, after referring to his initial demonstration before the Heidelberg Congress in 1895, reports in detail two cases with colored drawings. As these are among the earliest cases they should be studied in the original text.

Jacoby describes the appearance of a fundus in which there were several aneurisms. The largest one was in the extreme upper part of the fundus and to it extended two immense folds. There was considerable beading of the artery and some tortuosity of the vein. The drawing shows evident pigmentation about the largest tumor mass.

Two cases of a rare retinal condition were reported by Guzmann. In one there was a decided enlargement of the veins with multiple angiomas. A crude drawing of the second is the best illustration of the type of this process where the lower, extremely full, and tortuous temporal vessels extend to a globular mass.

Morton reported "a peculiar form of retinal disease" in 1908. His colored drawing shows the details of the case which was characterized by (1) numerous masses of exudate, (2) fusiform and globular expansions of the blood vessels with tortuosities, (3) loops, (4) kinks and (5) glomeruluslike formations. Secondary glaucoma necessitated the removal of the eye.

Pooley's case had an enormously enlarged and very tortuous artery and vein, with a yellowish pink mass in the lower fundus. There were several pearly white patches parallel to some of the vessels, but there were no hemorrhages.

W. C. Bane exhibited a sketch made in 1895 of a thirty-two-year-old man who had been losing sight in the left eye for four years, and in the other eye for at least three years. Vision of the right eye was 6/15. The right upper temporal vein and artery were tortuous and three times their normal diameter, with a rounded tumor two disc diameters across which was about 3.5 disc diameters from the disc. On a branch vessel two smaller tumors were also noted. There were some fine, white deposits below the main tumor. In the left eye the upper temporal artery and vein were irregularly enlarged.

Moore's case was a bilateral angiomatosis of the retina in a girl of twenty years. The upper temporal artery and vein of the right eye were three or four times their normal size, very tortuous and turgid. The veins were slightly darker than the artery. The vessels end abruptly in an oval, buff-colored, raised area between two and three times the size of the disc. In the left eye there were two areas (one above and one below) with general characteristics similar to those in the right, except that the vessels were not quite so large. Pressure on the globe blanched the area, which seemed to be a spongy, vascular tissue.

An instructive case was presented

by Snell before the American Ophthalmological Society in 1927. This was illustrated with two black and white drawings and one colored sketch. In 1919 the patient, then thirteen years old, had been physically negative and the fundus had been clear. When reexamined in 1923 the fundus had again been negative, but in February, 1926, ophthalmoscopic changes had started which have since steadily progressed. The drawings were made in April, 1927. The two striking alterations were varixlike groupings of dilated veins, and a globular cystlike detachment of the retina. In 1929 the case was further reported upon because four interesting events had taken place: subretinal hemorrhage, acute glaucoma, complete detachment of the retina, and a quiet, soft eye following a posterior scleral trephining operation. The lens was clear. There were no posterior synechiæ, although the iris was in contact with the cornea. The vitreous was filled with cholesterin, and all of the retinal vessels, even the varix dilatations, were empty.

Lindau reported his findings of the association of angiomatosis of the retina with cerebellar cysts in two classical articles; these must be read if one is to have a true conception of the importance of the fundus changes in relation to the constitutional manifestations of similar lesions elsewhere in the body.

Rochat, Cushing and Bailey, Paton, Møller, and Junius have all added to our understanding of the disease and its bizarre symptomatology.

Like many other medical curiosities individual names have been applied, so we have Treacher Collins, Hippel, Czermak, and Lindau commemorated for their distinctive contributions. In this connection the monumental monograph of Coats must always be recognized.

It would seem from the perusal of the literature and the clinical résumé of these three cases that one reason for the clinical confusion and the various terms applied to this complex disease is that cases are often seen in a rare phase, one that may have escaped previous recognition or at least not have been reported. It is for this reason that we have especially emphasized the photographic life history.

In the early stages the diagnosis will be made not only by the dilatation of one or more veins, but by the color of the vessels, the partial retinal detachment, and the other characteristic train of progressive symptoms.

Occasionally, the primary examination discloses a picture resembling a true choked disc with an immense swelling and macular star. This calls for careful differentiation. One such case is recited here and others have been previously reported by such keen observers as Fuchs, Guzmann, Erggelet, Tresling, Lindau, and Rochat. It is of importance to remember that there may be a hereditary element in the condition, which Collins in his first paper stressed and which has lately been emphasized by Moore, Lindau, Rochat, Cushing, Paton, and others.

The type in which the vascular lesion is the early and dominant sign has been drawn by Ditroi and described in Gamper's résumé.

The differential diagnosis is sometimes very difficult, especially when the history is obscure or the clinical picture is far advanced; this is particularly true if the stages of angiomatosis are not clearly understood. The most frequently recorded error is to call this disease glioma of the retina; many eyes have been enucleated because of this incorrect diagnosis. Proliferation of the uveal pigment about the pupillary border and the grayish, lobulated retinal protrusions are often the terminal signs of angiomatosis.

Care must be taken to differentiate this disease from glioma and to distinguish it from the retinal changes caused by brain tumor, nephritis, tuberculosis, and other constitutional diseases.

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DIFFUSE HYPEROSTOSIS OF THE SPHENOID WITH GREAT ENLARGEMENT OF THE ANTERIOR CLINOID PROCESSES: OCULAR MANIFESTATION

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(Translated by W. H. CRISP)

In a woman the vision of whose right eye had been very poor since childhood, radiographs disclosed a large hyperostosis of the body of the sphenoid and of its wings, with considerable enlargement of the anterior clinoid processes. The optic nerve was atrophic. The other nerves which traversed the sphenoid were intact. This case is contrasted with one of enormous hyperostosis of the horizontal lamina of the frontal bone, without focal disturbance. Read before the Academia de Ciencias de la Habana, May 9, 1930.

Intracranial tumors appear more and more frequently in the statistics published by ophthalmologists. This is not to be interpreted as indicating that they are more numerous than twenty-five or thirty years ago, but as evidence of greater precision of diagnosis, due to increased perfection of the methods of investigation, and more particularly to progress in radiographic examination. But, notwithstanding the help of the laboratory and of the x-ray, some patients die in consequence of intracranial tumors which have not been diagnosed, whereas others, carrying a tumor compatible with life, attribute their ills to different disorders, while the real cause remains unrecognized by the physician himself.

The clinical case dealt with here is a good example of an intracranial tumor which failed to be recognized even by the specialist, but which yielded up its secret upon more exhaustive use of the available methods of investigation.

On November 4, 1927, I was consulted by Mrs. X.X., who stated that since girlhood she had seen poorly with the right eye, although there had never been any pain in this eye. Her parents took her to an oculist in this city, who for seven years kept her under treatment with iodide, administered by the gastric route or in the form of a collyrium. The visual disturbance gradually increasing, she went to another oculist, who treated her for some years with series of periodical injections of strychnine, and gave her also cylindrical lenses of minus 0.5 D. axis 180 degrees. The vision of the right eye continued to diminish very slowly, and the patient therefore came to me.

My findings upon examination may be summarized as follows: Externally there was nothing abnormal. The visual acuity of the right eye was limited to counting fingers at a distance of two feet, and was unimproved by any lens; in the left eye visual acuity was 20/50, improved to 20/40 with plus 0.75 cylinder axis 90 degrees. The pupils reacted well to light and to accommodation. The optic disc of the right eye was pale and slightly excavated, the vessels somewhat distended on the nasal side, the rest of the fundus healthy and the refractive media clear. In the left eye the ophthalmoscopic examination showed nothing abnormal, although the outer half of the optic disc was paler than the ordinary. The ocular tension, taken with McLain's tonometer, was 70 mm. for the right eye and 26 mm. for the left. The right visual field showed normal limits and a partial central scotoma, particularly for red and green. (Figure 1.) The left visual field was completely normal.

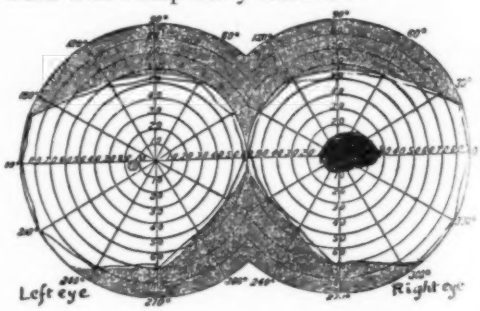

Fig. 1 (Ferrer). Visual fields in case of sphenoidal hyperostosis.

At this first examination, two diagnoses called for consideration: retrobulbar neuritis and glaucoma. In favor of neuritis was the visual field, with its normal limits and its central scotoma, particularly for red and green. In favor of glaucoma was the high tension. The atrophied and excavated optic disc might correspond to either one of the two diseases mentioned. It would also be possible for both affections to coexist in this eye. The intraocular hypertension of the right eye might also have been transitory, and I am inclined to believe this in view of the fact that in a few weeks it yielded to the use of eserin and pilocarpin, and that it had not recurred during the three years of my observation of the patient.

With a view to discovering the cause of the optic neuritis, I had Wassermann tests made on the blood and the cerebrospinal fluid, with negative results. The urinalysis was also negative. I then requested radiography of the cranium in order to investigate the question of intracranial pressure and the possible presence of a tumor, as well as with regard to the condition of the paranasal sinuses and of the teeth. The radiographs made by Dr. Fariñas (figures 2 and 3) revealed a hyperostosis of the body of the sphenoid and its wings, with the anterior clinoid processes considerably enlarged, clouding of the sphenoidal sinus, and integrity of the diameters of the sella turcica. It was evident that the hyperostosis of the sphenoid, acting on the right optic nerve, had caused its atrophy.

It is remarkable that, in spite of the large hyperostosis of the sphenoid, only

Fig. 2 (Ferrer). Radiograph showing sphenoidal hyperostosis.

the right optic nerve was affected where it passed through the optic foramen or between this and the chiasm; the other nerves which pass across the sphenoid, Bock's pharyngeal nerve (which passes through the pterygopalatine canal); the third, fourth, and sixth pairs and the ophthalmic branch of the trigeminus (which pass through the sphenoidal fissure); the superior maxillary nerve (which goes out through the large foramen rotundum); and the inferior maxillary nerve (which goes through the oval foramen) were intact, and functioned quite normally.

Investigation of the literature in regard to this clinical case convinced me of its extraordinary rarity. Hyperostosis of the bones of the cranium, more or less extensive, is seen with some frequency, and may be accompanied by disturbances due to compression or may occasion no compression, as in the case illustrated by the radiographs further

Fig. 3 (Ferrer). Radiograph showing sphenoidal hyperostosis.

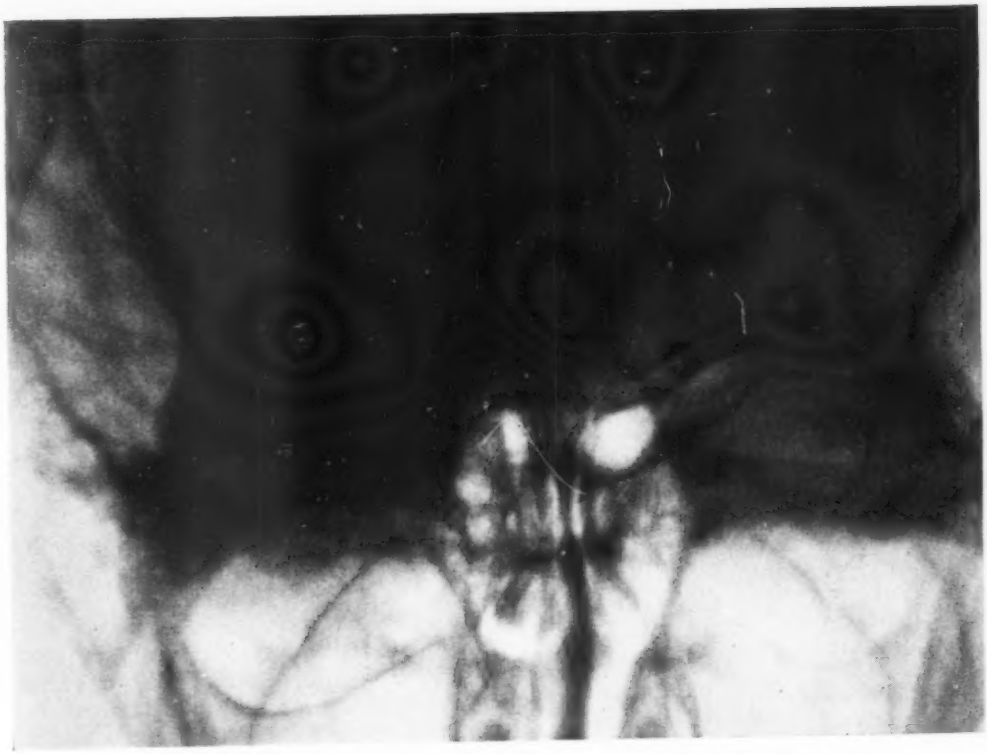

Fig. 4 (Ferrer). Radiograph showing hyperostosis of frontal bone.

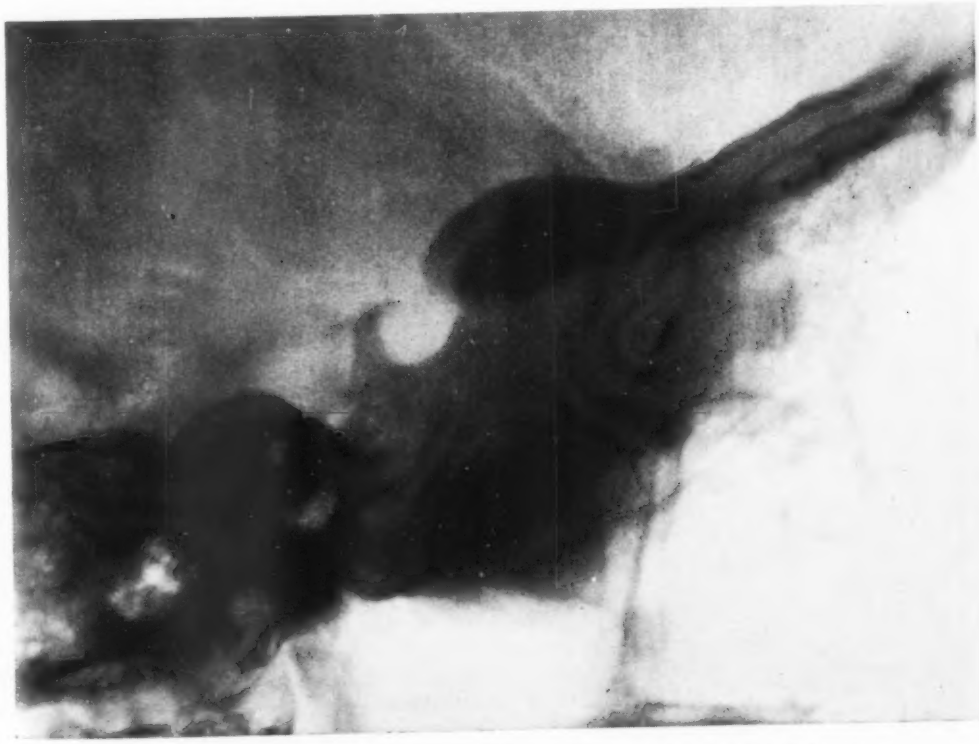

Fig. 5 (Ferrer). Radiograph showing hyperostosis of frontal bone.

shown here (figures 4 and 5), which reveal an enormous hyperostosis, almost pediculated, of the horizontal lamina of the frontal bone, unaccompanied by focal disturbances. But it is truly exceptional to find a diffuse tumor of the sphenoid with so great an enlargement of the anterior clinoid processes and complete invasion of the sphenoidal sinus. This consideration led me to present the radiographs to various oculists, in my last journey to the United States, and, after they had assured me that they did not know of any similar case, I placed the record before Dr. A. Elschnig of Prague. This eminent surgeon had no hesitation in assuring me that my case was very interesting and possibly unique, and he was kind enough to send me the following note with regard to a study of the radiographs by Professor W. Nonnenbruch.

Analysis of the radiographs

Base of the skull: The steps from the anterior to the middle cranial cavities are precipitous and deep. The steps from the middle to the posterior cranial cavities are normal.

Sella turcica: In the form of a basin or deep dish, of moderate size.

Anterior clinoid processes: extraordinarily enlarged, rough, with the free extremities rounded.

Dorsum sellæ: fairly narrow, thin; the insertion of the tentorium calcified.

Posterior clinoid processes: fairly short and thin, without abnormality.

Body of the sphenoid: The cavities are not recognizable; the bone as a whole appears to be decidedly sclerosed, the greater wings of the sphenoid definitely enlarged.

Sphenoidal plane: Is covered by the greatly enlarged clinoid processes.

Diagnosis: Hyperostosis of the sphenoid with notable enlargement of the anterior clinoid processes.

As suggested by Professor Elschnig, I decided to publish this case, and brought it in the first place before the Academy of Sciences of Havana.

A few comments before closing. The etiology of these tumors is unknown. Nevertheless, being in the habit of bearing constantly in mind the possibility of a hereditary taint in certain obscure cases, and although the history and the laboratory tests were negative, I subjected the patient to a series of injections of bismuth, which improved her general condition considerably, causing her to gain twenty-six pounds weight in ten months. Three years later, at my request, Dr. Fariñas made a new radiograph which demonstrated that the lesions had undergone absolutely no further increase in size. Was this due to the specific treatment? It is possible, but we must remember also that the majority of cases of hyperostosis of the cranium only develop during the period of growth of the patient and that they remain definitely stationary when bony development has been completed.

Avenida de Wilson y L.

MONOCHROMATIC VISION

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The literature of the subject is reviewed. It is suggested that achromatopsia should not be regarded as a division of color blindness. In the reported cases of achromatopsia it seems not unlikely that the chromosomes of both parents have been affected. The patient is sometimes rendered more comfortable by wearing dark glasses. Read before the American Ophthalmological Society, June 2, 1930.

Among those whose appreciation of colors is defective are the persons who appear to have no perception of color, and by whom no color sensation at all is experienced. They are classed as the totally color-blind (the "achromates"); their vision, therefore, is spoken of as "achromatic", and their state that of "achromatopsia". To such persons a colored visual field may be likened to a black and white steel engraving with its various shades of gray.

The spectrum appears to them as a streak of light of graduated intensity frequently described as "brightest in the middle"; or as of one hue, which they usually describe as gray; or, again, as a colorless band, differing only in the brightness of the various sections. The red end of the spectrum is shortened, but not the violet. The part which appears to them brightest is either in the green or the yellow. When the "luminosity-curve" is worked out it is found to coincide in a very remarkable manner with the normal "achromatic", "scotopic" luminosity-curve. The maximum luminosity with the gas-lamp spectrum is at about 536 μμ, with sunlight at about 527 μμ.

There are two general classes of this affection, the congenital and the acquired. This communication deals with the congenital form, which, from the mystery surrounding its origin and its inexplicable symptoms, offers to us all an interesting field for clinical observation and physiologic and pathologic speculation.

The number of the published cases of this strange anomaly is about 130. The first described case was that by Huddart, in 1777. It is supposed to be very rare in Europe; in the United States only a few cases have been recorded. Nettleship, in 1909, analyzed the literature and recorded but 84 cases to that date, and in 1926 Julia Bell could number only 119. Since then a few more have been added. Beach, of Portland, Maine, reported three cases in 1928. Beach's cases prompted the presentation of this paper, which has been in preparation for a number of years, with the hope that observers in this country might make known their own cases and thus add their contribution to the history of this rare and singular anomaly. Fry, of Philadelphia, recently reported a case. I have not one of my own to offer. According to Vogt, the scarcity may be more apparent than real, because he found three cases during the examination of 4,000 children in the Basle schools. He ventures to suggest that many have been overlooked because poor vision is the primary defect commonly complained of, so that oculists may not have tested their cases for color sensitivity. The only previous cases reported in Switzerland were three found by Pflüger, in 1898, in a Grindelwald family of ten members.

The literature of the subject is already voluminous, being scattered widely among scientific publications. As it is derived from such various sources it has been my intention to so formulate a critical survey as to make it possible for practicing ophthalmologists to have at hand an epitome which shall serve them as a text upon which to base their studies of any suspected cases, as well as to give them some idea of the speculations which have been entertained concerning the origins of this strange and unfortunate human defect. Julia Bell, in her exhaustive treatise in the Nettleship "Memorial volume of

the treasury of human inheritance", considers the condition in the part relating to the general subject of color-blindness, and supplies an extraordinarily complete chronological bibliography with analyses of a large number of the cases.

No predisposing factor other than that of an inherent defect of unknown nature can be suggested for the causation of achromatopsia. Several members of a family may be found affected, among whom consanguinity and other hereditary anomalies appear as factors in the incidence of the defect, yet Vogt found three cases in three separate families having no relationship to each other, and no other cases could be discovered in any of these families. Thus far, the disease has not occurred in more than one generation, since in every case the parents were believed to be normal, except in a case described by Nettleship and Spicer wherein the father of three affected sons "probably had the same disease." In a family of seven children, Klainguti found four who had retinitis pigmentosa and nystagmus, together with total color-blindness. In this family, as in one reported by Vogt, there was consanguinity of the parents, and Klainguti concludes that both retinitis pigmentosa and total color-blindness are recessive characters which appear only when inherited from both parents.

Males are affected about twice as often as females. Boehm described, in 1857, the total color-blindness of six brothers. In the ten pedigrees published by Nettleship there were thirty-four cases, among which were eighteen males, fifteen females, and one of unrecorded sex. In recent studies concerning the heredity Wernicke tells of two cases in brothers; Velter reports a brother and sister; and Waardenburg, who appeals to physicians to accumulate data on the hereditary character of total color-blindness, cites two cases, in a brother and sister who were the children of cousins. In Beach's report was an account of the condition in three sisters, the first, the sixth, and seventh members of a family of eleven. The father had normal sight, but one of his three brothers had advanced pigmentary degeneration of the retina without color defects. The patient's daughter had perfect color vision.

Apart from the color defect, the subjects usually have very bad central vision; the amblyopia is very frequently as low as one-tenth of the normal. In many cases there is undoubtedly a central scotoma, together with nystagmus and marked photophobia. Generally the subjects are painfully dazzled by bright light. Even ordinary light is unbearable and causes an unpleasant sensation as of a luminous cloud before the eyes. The photophobia increases with the intensity of the light and is absent with low illuminations. In dim light therefore they commonly see fairly accurately. Central vision is also slightly improved by lowered illumination. Uhthoff found the maximum at twelve meter candles, while the normal maximum is thirty meter candles or over. The scotopic visual acuity resembles the normal; the light sense, whenever it has been tested, has been found good. The curve of visual acuity with gradually increasing light intensities shows no sudden bend as in normal-sighted persons, but continues in the same direction as for lower intensities, until photophobia sets in (Koenig).

No objective cause for the photophobia can be found. It is believed, however, that the unpleasant sensation experienced in a bright light is due to interference with vision rather than with any painful sensation. Thus the patient may be able to look at a strong light without discomfort, but becomes practically blind for several minutes afterwards (Nagel and May). The examination with the ophthalmoscope through the dilated pupil may cause no discomfort, yet great diminution of vision may follow and last for some time.

Nystagmus almost always has been present, yet it was found not quite as often as amblyopia and photophobia. In certain of the collected cases it is not mentioned. It bears a striking resemblance to that form met with in miners. This nystagmus is sometimes rather

slow in the condition of rest, becoming very rapid, with short excursions, on fixation. It may be absent in the dark-adapted state. Wernicke reported two cases in brothers who had only one-tenth vision, dread of light, and vertical nystagmus. It has been absent in one eye (Nagel) in certain cases in which it was found early. It has disappeared some years later. Grunert noticed diminution in one case in the course of eleven years. But all these exceptions were elderly persons, whereas most of the recorded cases were in children.

The field of vision is generally normal, though Grunert found a ring scotoma in one of his cases. While an absolute central scotoma has frequently been found, its presence is very difficult to demonstrate, due largely to the accompanying nystagmus. When scotomata have not been demonstrated we are not justified in assuming they were necessarily absent. The positive cases have exhibited macular and other fundus changes. In the cases where a central scotoma was observed there was accordingly blindness for both color and light. Parsons states that though it may be that "all cases have not an absolute central scotoma, it has been certainly observed that foveal vision is very defective even when compared with parafoveal, and this observation has been admitted by Hess."

Because of the nystagmus, ophthalmoscopic examination is difficult; the results, therefore, are accordingly uncertain, yet it is stated in the majority of cases that the ophthalmoscopic appearances have been found to be quite normal, and that no pathological changes were noted in the macular region. Vetter has reported a case with a light red, unpigmented zone in the macula of each eye. Wölfflin and Waardenburg examined their cases with red-free light; with this light they noted the absence of the yellow coloration of the macular region and the failure of its usual oval reflex, indicating a definite defect in the structural development of the macula. Objective causes for the defective central vision have been found, however, for example corneal nebulæ, moderate albinism, pallor of the discs, and macular changes.

Many patients have shown manifest divergent strabismus. Because of the reduction in central vision binocular fixation is interfered with and the eyes readily take up a position of rest which is usually one of divergence.

No patient has shown good central vision. The amblyopia is not secondary to errors of refraction although it has been noted that errors have existed. When correction has been possible the vision has improved but little. Certain of those affected have declared themselves capable of such extraordinary and bizarre powers as the ability to see roentgen rays.

Studies of the motor reactions of the totally color-blind under various conditions of light adaptation are not without interest. Engelking observed in several patients that flashlight pictures revealed certain characteristic positions of the lids and the eyeballs which were assumed under stimulation with different colors. The lids were nearly shut and the eyes were turned upward in response to bright gray or yellow-green; they were half-shut and the eyes half-exposed with dark gray or blue; but were widely open, fully exposing the eye, with black and red.

Hess, while studying the pupillary reactions in normal healthy eyes, noted that when two lights of unequal intensity played upon the eye in rapid succession, the pupils became narrower with the strong light but wider with the weak light. With two lights of different colors but equal brightness the pupils remained unchanged. In total color-blindness however these pupil changes did not occur. In partial color defects the loss of sensitivity was accompanied by a loss of pupillary change for the colors most involved, while there was an increased response to other colors.

Engelking, working with the pupillometer, in a series which included the normal, protanomalous, protanope, and totally color-blind, further observed that the width of the pupil varied similarly according to the brightness of the

stimulus color. In adaptation the totally color-blind reacted very differently from those with other types of defect. After dark adaptation the pupils of the totally color-blind reacted to a strong light as much, though more slowly, than did the normal. After bright adaptation followed by dark adaptation, the pupils of the totally color-blind opened much more slowly than did the normal and the partially color-blind. Because all the other types reacted in much the same way, the totally color-blind may be put in a class by themselves, which fact may perhaps be explained on the duplicity theory, to the effect that the totally color-blind have only a twilight apparatus which under other conditions adapts itself much more slowly than does the daylight apparatus to changes in illumination.

This "differential pupilloscopy" has been of distinct service in confirming the belief long entertained that in the middle zone of the retina stimulations appreciated as colors are accompanied by changes in the size of the pupil. This ability decreases in force from the center to the periphery.

It is unfortunate that no entirely satisfactory microscopic examination has been published of a congenitally, totally color-blind eye. In a case demonstrated by Larsen in 1921, in one eye (imperfectly prepared) the cones and rods were both present, the cones being in the usual number. In the study of the other eye, which was in perfect condition, sections of the fovea disclosed variations in the size and the shape of the cones, but the cones were no fewer than in the normal eye. Altogether, Larsen's report is not convincing, because such changes as he noted might of themselves be the cause of the unusual symptoms manifested by the achromates and yet not be indicative of the affection known as congenital total color-blindness. Before accepting any report of the histologic study of the eyes of typical subjects there must be (1) a complete clinical study, including a most searching exploration of the entire field of vision to ascertain the absence of reactions in all the zones, and (2) a corresponding examination of the brain, for it is well known that disturbance of cerebral origin from pathological processes may cause total color-blindness without any demonstrable affection of the retinal structures.

Since achromatopsia is congenital, the study of its origin can at best be only an investigation of the evolution of the color sense in other sentient beings.

According to MacDougall the vision of the lower animals is monochromatic, being responsive only to brightness, hence simply to white or gray. A little higher in the scale there arises a differentiation at the "cold" end of the spectrum as to white or bluish hue, and, as we ascend, at the "warm" end, where yellow is perceived. Farther on these may become mixed so that when there is response to yellow and blue, a yellowish blue is perceived.

Such perception as is manifested at the peripheral zone of the retina is considered to be but the relic of the primitive stage of monochromatic vision; hence the loss of reaction that is observed in the totally color-blind may be looked upon as a total reversion to this remote ancestral condition.

Vogt believes that color-blindness is recessive in origin and that the consanguinity of the parents of a subject plays an important rôle in its production.

Schiøtz, after a review of the published genealogies and a comparison of these with his own, concludes: "If we assume that color-blindness is carried by the sex chromosome, then every feature of its inheritance becomes perfectly clear."

It is conceded by König and by Kries, as well as by Ladd-Franklin, that the fovea is void of rods; therefore, if there be absent in an individual all sensations for color, such absence of reactions points to the destruction of the rods, because no light sensation can be produced without the presence of rods. Yet Hering and Hess reported cases

in which there was no blindness at the fovea, which condition argues that there must be some other form of apparatus which is capable of arousing light sensation. Consequently, the theories of König and Kries, which predicate that the cones perceive color while the rods are concerned with the colorless sensations, are contradicted.

Hess and Hering maintain that the cones are for "color" sensations and the rods for "colorless" sensations, corroborating the hypotheses that total color-blindness occurs in two forms. In the first form, because of defective conditions of the cones, nystagmus, photophobia, and foveal blindness are manifest. The second form, which is less frequently observed, manifests none of these attendant symptoms but depends upon some difficulty in transmission through the nerves of conduction to their receiving station (Collins).

The explanation of monochromatic vision offers special difficulties and is quite complex. According to Schenck, three types are to be distinguished: (1) the peripheral total color-blindness of normals and deuteranopes; (2) the peripheral total color-blindness of protanopes; and (3) scotopic total color-blindness. He believes that the white visual substance of the rods develops in such a manner as to become relatively more sensitive to rays of medium wave length, which produces the white substance of the protanopic cones. Out of this white substance the normal peripheral cone white-substance is developed by further differentiation, whereby it becomes more and more sensitive to rays of long wave length (Parsons).

Ladd-Franklin explained total color-blindness somewhat as follows: At the fovea there are no cones but only rods which lack visual purple. Kühne, it may be recalled, found rods in the region of the fovea so characterized. It may be believed that the fovea possesses undeveloped cones, which, though containing the same photochemical substance as is found in the rods, are incapable of arousing color sensations. Finally, it may be declared that such cases have no visual elements in the fovea capable of performing any functions.

This is in effect the explanation of Schenck who believes that complete monochromatic vision may be due to (1) pure rod vision; (2) arrest of cone development at the rod stage (total color-blindness without central scotoma); (3) arrest of cone development at the protanopic peripheral cone stage (pathological cases); (4) arrest of cone development at the normal peripheral cone stage.

It might be explained on the Young-Helmholtz theory by the identity of all three components. The facts observed do not support this view, and they are much more satisfactorily explained by the duplicity theory. Schenck at the same time regards monochromatic vision as divided into various types, some of which are due to modifications in the cones, and must therefore be correlated in some such manner as that suggested with the three-components theory.

In endeavoring to assign this variety to an appropriate place in the classification of the various forms of color-blindness one might be justified in concluding that all forms are but a series of progressive color defects. Thus Collins found a case in which certainly yellow and blue were the only colors perceived. It is these colors which are the last to be appreciated by man before monochromatic vision supervenes. When we consider the relation existing between the normal green-blind, red-blind, and the totally color-blind forms, they might be taken to represent a definite evolutionary series rather than an instance of the transition of one form from another, such as has been manifested as an interrelation between the green-blind and the red-blind.

While some cases of monochromatic vision have been looked upon as simply reduction forms of trichromatic vision, the facts are inconsistent with the view that it can be of such a nature. Klainguti opposes the suggestion of Hess that protanopes represent a transition

stage between deuteranopes and the totally color-blind, because protanopes show none of the most characteristic defects of the totally color-blind, such as foveal blindness, nystagmus, or light dread, yet they do approximate the totally color-blind in pupillomotor values and in the shifting of brightness to the blue-green region.

Therefore it may be as Hess and Engelking claim that deuteranopes and protanopes are radically different and also that protanopes share certain deficiencies with the totally color-blind. Engelking found a marked difference in the brightness curves of the two groups, and he noted other peculiarities of the totally color-blind, such as reduced visual acuity, slower widening of the pupil on reduced lighting, and a lower fusion frequency, which peculiarities are not found in protanopes.

Hering attempted to explain the differences of the photopic and achromatic scotopic luminosity curves according to the theory of the specific brightness of colors. It is, however, more likely that the differences of luminosity observed in various colorless mixtures, while passing from parafoveal to peripheral vision or on changing the condition of adaptation of the eye, are dependent on the physical stimuli or wave lengths of the light, rather than on the manifestation of their physiologic valencies. Tschermak found in the normal photopic eye that the white valencies of different lights changed unequally in passing from the center to the periphery, as well also as during dark adaptation. He believed that the white valencies of all light change under different conditions, increasing for the normal and the color-blind eye in passing from light adaptation to dark adaptation. In the normal this change is unequal in that the white valencies of the long-wave length lights increase relatively less than those of the short-wave length lights. With relative yellow-sightedness this adaptative change of the white valencies is more pronounced than with relative blue-sightedness. The two types of red-green blind persons show analogous changes. In typical totally color-blind subjects there is change in the absolute white valencies, but none in their relative values (Parsons).

A totally color-blind subject with myopia, astigmatism, and strabismus of the right (the weaker) eye was tested by Crosland. In the sorting of wools and comparing them with a set of fifty Hering grays, yellows were put into the lighter groups, and the greens and blues into darker groups, the reverse of the Purkinje phenomenon.

The influence of the intensity of illumination on visual acuity has been observed by König. As the intensity rose the curve showed a well-marked angle where the intensity changed from scotopic to photopic. In the wholly color-blind he found that this angle was absent, the scotopic part of the curve being continued in the same direction without interruption until an intensity was reached which caused dazzling and diminished visual acuity. In monochromatic vision, however, the usual diminution in acuity in the parafoveal region was not noticed.

Hess did not find foveal blindness in the totally color-blind. He claims that various phenomena occur in light adaptation and dark adaptation which are not readily explained in the Kries hypothesis that the totally color-blind are "rod-seers". If the foveal neuroepithelium retains its function at all it approximates in character that of the normal rods.

The luminosity values observed in total color-blindness correspond with those of the normal achromatic scotopic eye. A comparison of the curves shows, therefore, almost complete identity, as was demonstrated by Hering in 1891. The achromatopic curve is valid for all intensities, though photophobia occurs with the higher intensities where the normal achromatic scotopic curve is valid for only low intensities of objective lights. The process of dark adaptation pursues the normal course in the totally color-blind in whom exposure to bright light causes prolonged diminution of vision, and in whom recovery

follows in the manner which would be expected if it were dependent upon the restoration of the visual purple.

Hering found that the brightness degrees in the black-white equations of a typical color-blind were comparable to those obtained by the normal-sighted under conditions of dark adaptation.

Hoffman and Nussbaum report three cases of total color-blindness; one completely lacked macular adaptation, and one showed normal macular adaptation in one eye and none in the other eye. The authors claim that the macular functioning of the totally color-blind eye follows no definite rule either in bright or in dark adaptation, and cannot be used in deciding debated questions of color theory.

In testing an achromate with matches between orange yellow (600 μμ) and greenish blue (490 μμ), Nagel found that such a luminosity match could be made at ordinary intensities of light, whereas a trichromate had to be dark adapted and the intensities made very low. The achromatopic photopic retina contains less visual purple than the achromatic scotopic trichromatic, hence the trichromatic achromatic scotopic value for greenish blue is lowered by absorption relatively to the achromatopic (Parsons).

In the normal by increasing the intensity of the light the maximum is shifted towards the yellow, whereas in monochromatic vision the intensity merely increased the luminosity. The curve is also independent of adaptation. Attention has already been drawn to the similarity of the scotopic luminosity curve of bleaching values for different monochromatic lights for the visual purple.

Bender, using a Lummer-Pring spectral flicker photometer, studied the luminosity of spectral colors in nine normal subjects, and two typical achromates. The abnormal subjects were not only totally color-blind, but they had also low visual acuity and light dread; in them, the place of maximal brightness fell in the blue-green region, at about 515 μμ.

The rate of change of fusion frequency on intermittent stimulation of the retina has been found to be lower for achromatic scotopia than for photopic vision. Uhthoff found that the totally color-blind react like the normal with achromatic scotopic vision. Thus he observed on rotating a disc with black and white sectors with an intensity of light even above the normal photopic threshold, the flicker ceased in the blind but continued in the normal eye.

The flicker phenomenon in the totally color-blind accordingly follows the same laws as in normal achromatic scotopia.

Comment

It is to be regretted that achromatopsia has been considered as a division of color-blindness. Much confusion arises therefrom. In the study of a fairly large number of defective persons, in those congenitally color-blind I have not found such symptoms as nystagmus, strabismus, dread of light, amblyopia, and defects of the field of vision. Moreover, but few women have come under my observation, whereas the number of females reported among the cases of totally color-blind has been vastly greater than the accepted proportion, roughly one in a thousand of the ordinary forms.

Red-green blindness is in an entirely different category. In it successive generations have been known to be defective, and the transmission has been carried on by the females, who rarely indeed have shown the defect with their brothers. In the reported cases of achromia it is not unlikely that the chromosomes of both father and mother have been affected and their defects have been transmitted to either sex or both of their children.

Little can be done to alleviate the discomforts of the subjects and to reduce their disabilities. Beach and Greenwood have added greatly to the comfort of their patients by the careful adjustment of spectacles made up in dark tinted glass. A patient of my own pre-

senting nearly all the symptoms of this affection, who is however the victim of extensive macular degeneration in each eye, has been afforded much relief by the wearing of compound minus corrections in dark, so-called Crookes', glass.

It may be that study of the congenitally totally color-blind, and the observation of like details in those who acquire such blindness, will lead to a deeper understanding of the mysteries of human color perception, both in the acquisition of that sense by the lowest, onward to the highest forms of vertebrates, and in the recession of that acquirement by the race through the transmission of genetic faults as well as those derived from embryologic and pathologic causes.

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LARGE RETENTION CYST OF EYELID

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GARY, INDIANA

This exceptionally large cyst of the lower eyelid was diagnosed microscopically as a retention disc probably originating in a sweat gland. From the department of ophthalmology, Northwestern University medical school.

Mrs. M. M., aged sixty-one years, entered the Northwestern University eye dispensary May 14, 1930. She stated that her eyes had apparently been normal until seven years previously. At that time she had detected a white pimple in the skin at the lid border near the inner canthus. The swelling had gradually and painlessly enlarged and attained its present size. Four years ago the swelling had been incised and clear fluid had escaped. Two weeks after this incision the swelling had recurred, and was again incised and drained, only to recur later. Two years ago the patient had accidentally opened the sac with her finger nail. Again it reformed and enlarged to its present size. Besides the resulting cosmetic defect the patient complains that the swelling pulls the lid from the eyeball. Moreover, she cannot wear her glasses comfortably.

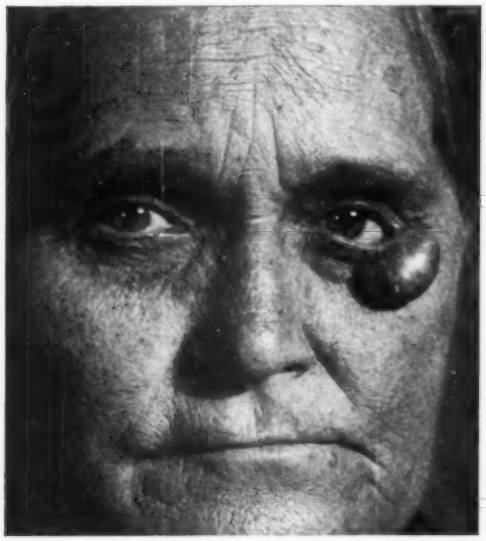

Fig. 1 (Keckich). Retention cyst of eyelid.

The general physical examination, as well as the blood Wassermann and urine tests, was negative. There were several 2 by 3 mm. xanthomata in the skin of the upper lids near the outer canthi. There was a tense, cystic swelling of the skin of the lower lid near the outer canthus. It measured 15 by 25 mm. and transmitted light readily.

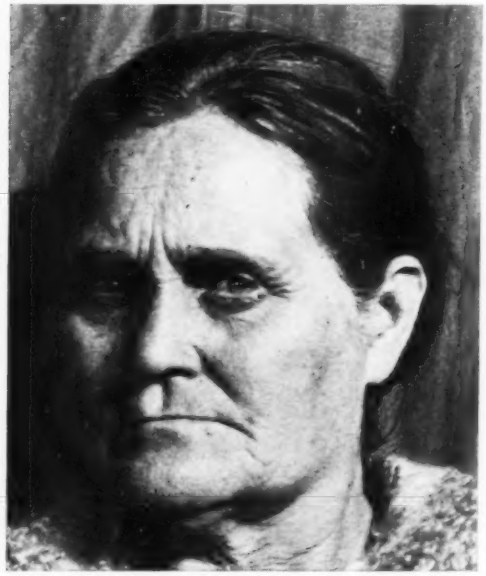

Fig. 2 (Keckich). After operation.

The skin over the swelling was stretched, making the vessels and papillæ stand out distinctly. The weight of the cyst pulled the lower lid down and out from the bulb leaving a 4 mm. sulcus between the eye and the lid. The left palpebral conjunctiva over the base of the sac was injected and thickened. There was a slight injection of the bulbar conjunctiva adjacent to the point. There were no cilia along the outer half of the affected lid. The outer surface of the cyst measured 30 mm.

with the exophthalmometer; on the opposite lower lid the corresponding reading was 18 mm.

The cyst was removed under local anesthesia. It had a well-defined sac, which was completely removed. The sac ruptured in the process of removal and emitted a clear straw-colored fluid. The exposed base was cauterized with pure trichloracetic acid. The redundant skin was excised and the wound sutured; vaseline and a pressure bandage were applied. Healing was uneventful. Figure 2 shows the condition two weeks after removal. There has been no recurrence (it is now four months since removal).

The sections show that the lining of the cyst is a layer of cuboidal epithelium from one to three cells deep, which is apparently intact everywhere. There is no evidence of inflammation in the cyst wall, and the epithelium over it is normal. The pathologic diagnosis is retention cyst of the lid, probably originating in a sweat gland.

Gary State Bank building.

ANGIOMA OF THE NERVE HEAD

With case reports

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New fine vessel proliferations from the disc into the vitreous are not unusual in cases of retinal arteriosclerosis with hemorrhages and exudates. Similar proliferations in cases of retinal endarteritis accompanied by hemorrhages should not be rare; probably many exist but are not found until some other disease or injury leads to an examination. True angiomas of the nervehead must be exceedingly rare. This paper indicates the importance of routine examinations. In cases of injury with medicolegal possibilities the advice is especially emphatic.

George ....., aged fifty-four years, came in on December 20, 1929, for the removal of a foreign body from the central area of the right cornea. The vision of the right eye at that time was 10/100, while that of the left was 20/20. The patient stated that the vision of the right eye had not been good, and that he had noticed no sudden change. He had had no pain in the eyes at any time.

External examination of the eyes, including the peripheral field of the right eye, showed nothing abnormal.

Ophthalmoscopically, the temporal border of the right disc was partially covered with a fibrous exudate, but the disc itself appeared normal in color. There was an endarteritis of the retinal vessels in the temporal quadrant of the fundus, especially of the vessels above and below the macular area. Fine kinky new vessels were observed, as well as old hemorrhagic areas in the periphery. The appearance suggested a thrombosis. The left fundus was

Angioma of the nervehead (Kuhn). Right eye, showing excessive capillary growth.

negative except for a wide cupping of the disc which suggested glaucoma.

The tension with the Schiøtz tonometer was 20 mm. right and 22 mm. left. The blood pressure was 120/60;

the urine was free of albumen and sugar. The Wassermann reaction was negative.

A tentative diagnosis of venous thrombosis of the right eye and of glaucoma simplex of the left was made. Potassium iodide in ascending doses of from three to ten grains was prescribed to be taken in water after meals. Pilocarpine was prescribed for the left eye.

On May 21, 1930, five months later, Dr. Meyer Wiener examined the patient and dictated the following notes:

"Right eye: Media clear, disc hyperemic, outline indistinct especially in the upper inferior and nasal margins which are entirely washed. There is a small central excavation, lamina cribrosa not showing. The vessels passing over the temporal quadrant of the disc are very tortuous and kinky. They show marked variations in their caliber during their course. The nasal half of the disc and upper and lower portions, especially the lower, protrude markedly forward and are covered with vessels which are extremely tortuous and winding very much like a glomerulus. The protrusion is fully two diopters forward of the temporal half of the disc. This portion of the disc also has a dirty chocolate-gray color, this color extending for quite a little distance beyond into the retina. The macular vessels are unusually tortuous and show marked variation in caliber, and two or three of them seem to terminate in little winding buds. The veins in general are about twice the size of the accompanying arteries and quite dark and quite bent. There are no hemorrhages or exudates to be seen either in the focal area or in the periphery. The refraction of the general fundus is zero. The refraction of the highest point on the top of the disc is two diopters or more.

Left eye: Media clear, disc normal in color and outline. Large excavation about two diopters deep extending almost to the temporal margin with plainly showing lamina cribrosa. There is a wide scleral ring with a faint physiological pigment deposit on the nasal margin, and an irregularly deposited pigment above and temporally with some atrophic choroidal pigment to the temporal side of the disc. The macula and periphery are negative, the vessels are normal in size, color and contour. Refraction is normal."

Dr. Wiener expressed an opinion that a neoplasm was growing from the right nerve head, and that it was probably an angioma.

The progressive changes found in this case in a period of about six months suggest that an angioma of the nerve head might complicate the recovery from venous thrombosis of the retinal vessels. The destiny of the progressive new vessel proliferation is conjectural. Can it lead to malignancy?

First Trust Building.

GONIN'S CAUTERY PUNCTURE FOR DETACHED RETINA

Report of three cases

ALBERT L. BROWN, M.D.
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Two out of the three cases here reported yielded excellent visual results. In the third case the retina became reattached but useful vision was not restored. Read before the Section on Ophthalmology of the American Medical Association, June 23 to 27, 1930.

It is uncertain who first described detachment of the retina but certainly James Wardrop, in his "Morbid anatomy of the human eye," published in 1834, gives a definite clinical and anatomic picture of the disease. Apparently the first operation was done by James Ware, as described in Mackenzie's treatise on "Diseases of the eye", published in 1830. Ware's operation consisted of a posterior scleral puncture with a cataract needle.

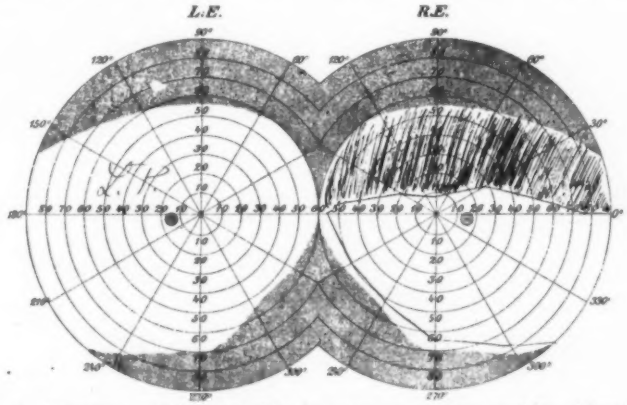

Fig. 1. (Brown). Visual fields in case one after sudden blurring of the vision of the right eye due to detachment of the retina: vision of left eye, light perception; right eye, 20/60. In all these readings the test object corresponded to one-half degree.

Since this time detachment has been recognized as having a grave prognosis and has challenged satisfactory remedy. Local treatment has consisted of instillations and subconjunctival injections of dehydrating solutions; this, with general treatment consisting of rest, iodides, sweats, general dehydration, and dieting, has been of little avail. Operative procedures are legion. Trephining, posterior sclerotomy, cauterization, introduction of horsehair, and aspiration have never gained general acceptance, either singly or in combination, as constituting a satisfactory solution.

Leber considered that rupture of the retina played an important part in detachment. Lister[1] reiterated this and stated that in most if not all idiopathic serous detachments retinal holes were present. Gonin[2] explains the failure of so many observers to find them by the fact that most tears are in a narrow zone measuring about 7 mm. separating the equator from the ora serrata. A hole in this region can be seen only through a widely dilated pupil with the line of gaze at an acute angle with the cornea. Often, too, a hole is hidden in the retinal folds. Gonin considers that idiopathic detachment never occurs without a tear and that closure of this tear is essential to a lasting cure. He therefore undertakes to close the tear by cicatrization following introduction of a cautery through the sclera into the tear, which he has previously located with the ophthalmoscope. Of a series of sixty detachments, he reported the

presence of one or more tears in fifty-three. Vitreous opacities in six prevented an examination, and in one the region of the ora serrata could not be investigated. Fifty percent of the sixty cases were reported to have had a successful outcome. Vogt[3] has reported three cases, and he characterizes the result in one of these as amazing. He concludes that this is an unexpectedly valuable procedure and recommends its thorough trial.

Schieck[4] did two operations, one of which resulted in reattachment without return of vision. In another case the retina became reattached and vision returned for just one day, but the retina became detached again and the condition was as bad as ever. This was in a case of high myopia in which Schieck says the cicatricial contraction caused another hole elsewhere with subsequent detachment. Axenfeld[4] felt that the method was praiseworthy but that the pull of one scar might lead to another tear, leaving the eye in a worse state. Fleischer[4] considers the possibility of loss of vitreous leading to hypotonus and consequent greater detachment. Hippel[4] tried the operation in three cases. One showed improvement for six weeks and in two the vision remained unimproved. Salzer[4] considers the procedure a most logical attempt to give the tissues a chance to regain function. Seefelder[4], out of five cases, reported entire success in one, improvement in two, and no improvement in two.

I report the following cases in some detail because I feel that the vision would certainly have been lost without the unexpected help from this procedure. So dubious was I about any lasting effect that I waited until all other methods had failed and used this as a last resort.

Case 1: W. T., a white man aged fifty-four years, an industrial executive, had sustained a heavy blow over the left side of the head twelve years previously. This had occurred in another city, in which a competent ophthalmologist had pronounced the resulting condition detachment of the retina. He was treated by rest and sweats but a complete detachment ensued, the vision being lost except for light perception in a small temporal strip. I had measured the refraction of his eyes annually for five years, during which time the right eye had a vision of 20/15 with a moderate hyperopic correction. At all times this eye was organically normal so far as could be seen.

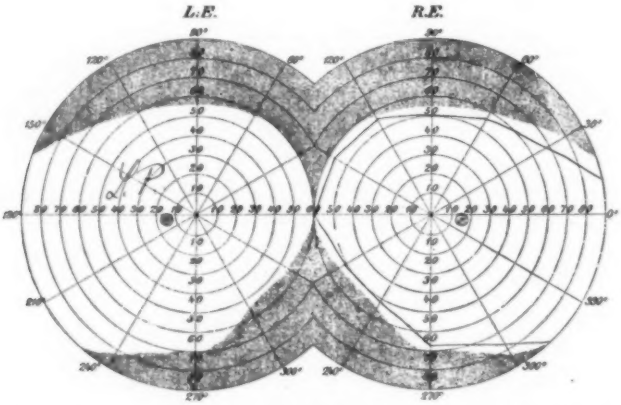

Fig. 2. (Brown). Vision in the right eye in case one after cautery puncture, showing expansion of the upper field to almost normal limits: left eye, light perception; right eye, 20/30.

January 3, 1929, the patient complained that the vision in the right eye had suddenly become blurred. He then presented a wavy detachment of the lower half of the retina extending near

the macula and to the disc, so that he had an almost complete superior hemianopia and vision of 20/60, which could not be improved (figure 1). Far down and in, there was an oval tear with pigmented edges resembling a choroiditic patch. He was put to bed. Careful physical examination revealed nothing except a blood pressure of 150 mm. systolic and 90 mm. diastolic. After two weeks of rest in bed with the eyes bandaged, saline dehydration, and a low protein diet, his condition remained unimproved.

After a month the patient became quite distressed and asked whether nothing more could be done. We discussed the possibility of a cautery puncture by Gonin's method. I was most dubious and told the patient that I believed it to be a remote chance, but he insisted that it be tried. February 10th, a cautery adjusted for a dull red glow was introduced cold through a small scleral opening prepared by the thrust of a Graefe knife at the spot where the tear had been estimated to be ophthalmoscopically. Contact was made for two seconds, then the contact was released and the cautery was removed. The tear was observed to have contracted immediately to an irregular, pigmented patch about one-tenth the size of the original tear. The retina was smoother but still detached. Atropine ointment was used to continue immobility of the ciliary body, and a bandage was applied and allowed to remain for five days.

On the fifth day the eye was examined and the retina was found to have become practically completely reattached, with a small pigmented patch at the site of the tear. There were striations running from the region of the ora serrata backward to about the equator, where they disappeared into smooth retina. The upper limit of the field had expanded to almost normal limits (figure 2). Corrected vision was 20/25. In spite of this amazing result I kept the patient in bed for an additional week and then allowed him up very slowly. He has maintained this improvement in spite of the fact that he is working again under considerable mental strain for seven hours a day. He is still on a low protein diet and is required to spend at least ten hours out of every twenty-four in bed.

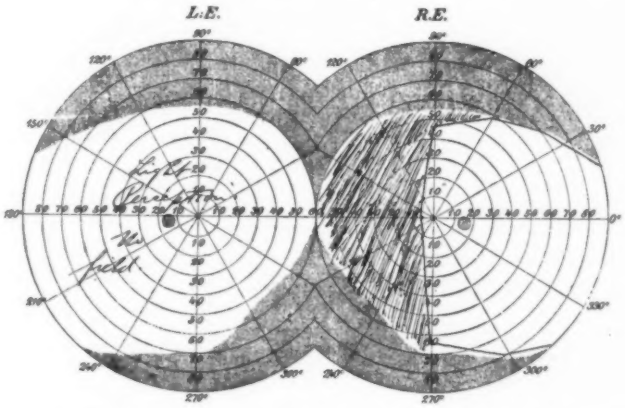

Fig. 3. (Brown). Visual field in the right eye in case three after sudden almost complete detachment of the retina: vision of left eye, light perception; right eye, 20/100.

Case 2: Mrs. C. H., a white woman aged fifty-two years, complained of arising in the morning of March 2, 1929, with blurred vision in the left eye. She had had no illness of any consequence, had no other symptoms, and had considered herself perfectly healthy. Ocular examination revealed an organically sound right eye with normal fields and vision of 20/15, with a moderate hy-

peropic correction. The vision in the left eye was restricted to hand movements and the field contracted to a small temporal patch. The retina was thrown into large billows and in the temporal and lower quadrants there were two tears about a half disc diameter in size. Physical examination revealed nothing of note. After two weeks of rest in bed and the usual general regimen, there was no improvement. The cautery puncture was employed in an attempt to close both of the visible holes. The ophthalmoscope showed a puckering in the lower hole and a slight contraction of the other. After five days, the retina had become generally but most irregularly reattached. The macula could not be recognized. The retina looked rather gray and was highly striate. Vision was limited to fingers at one foot and has not improved. This was an extensive detachment, and the bare reattachment of the retina must be considered as an improvement.

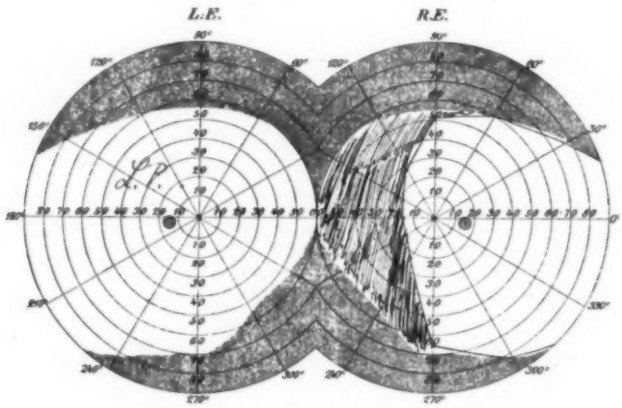

Fig. 4. (Brown). Result of rest in bed in case three: left eye, light perception; right eye, 20/70.

Case 3: W. Y., a white man aged twenty-eight years, had had a perforation of the left globe ten years before, caused by a piece of steel. There was an irregular pupil bound by the old capsular remains of a traumatic cataract. The pupil could not be dilated and only light reflex could be obtained. Vision was limited to light perception temporally. The patient stated that he awoke in the morning of May 3, 1929, with blurred vision in the right eye. He attempted to work (woodwork) but found it impossible to see clearly enough. The right eye had vision of 20/100, which could not be improved. The temporal half of the retina was detached almost to the macula with a fold partially overlapping it and extending well past the equator above and below (figure 3). Serologic and physical examinations did not reveal anything. Three weeks of rest in bed increased the vision to 20/70, but this seemed due to the reclination of the fold near the macula. The extent of the detachment appeared greater. At first no tear could be seen; but after rest in bed the folds smoothed out a bit and a large hole was visible far out temporally.

The questionable hope of a cautery puncture was offered to the patient and his family and was accepted. Vogt's[a] scheme of introducing a small needle was employed to locate the hole more easily. This consists of piercing the sclera with a fine needle at the point considered nearest the hole and viewing it with an ophthalmoscope. After the cautery puncture, the tear, which was originally narrow and about a disc diameter in length, was contracted to a round pigmented patch about a tenth as large. The surface of the retina was smoother, with a pinkish reflex near the edges of the unaffected portion. On the fifth day the whole temporal portion

was flat and somewhat striate but giving a reddish reflex throughout. Vision with a slight myopic correction was 20/30. The field had greatly expanded and after another week of rest in bed the patient was allowed to sit up. After careful checking of the results of more motion, he was allowed to work four hours a day. The condition of the eye has not changed since the examination on the fifth day after the operation.

Comment

The mechanism of the production of spontaneous detachment is most obscure. Nothing which suggests the retinal degenerative changes with large holes in the retina is a question. Why they do not develop in more cases of high myopia with low tension and thinned retina is another. It is, of course, probable that detachment can occur without a tear, and the chances are that this offers the best prognosis. This may be the reason why the outcome in the detachment of pregnancy is usually more favorable. These detachments present a part of a generalized edema which recedes when the reaction is over. The idiopathic cases with tears seem in a sense local, depending on a localized area of degeneration and

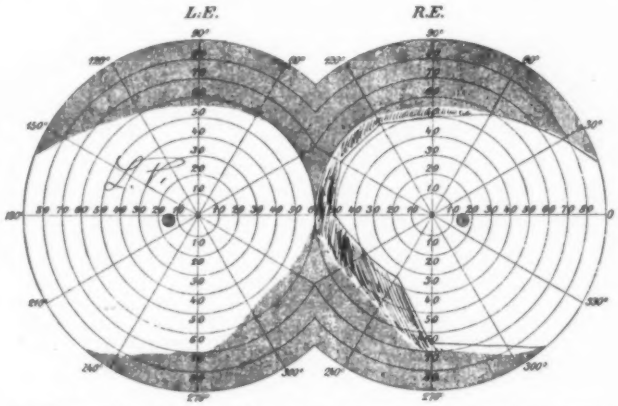

Fig. 5. (Brown). Result of cautery puncture, showing great expansion of the field of vision in the right eye. Vision of left eye, light perception; right eye, 20/30.

etiology is known of the biochemical changes in the fluids of the eye at the time of detachment. After the process starts it seems a mechanical one whereby vitreous fluid seeps through an opening in the retina, lifts it from the pigment epithelium, and is gradually increased and dispersed by motion of the head or by gravity. Why detachments do not develop in the countless cases of weakness for their start. Thus it would seem futile to stress general treatment when the paramount issue is to repair the local, mechanical defect. In this light Gonin's procedure is beautifully logical, and to my mind it has proved helpful enough to command attention for a thorough trial.

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PATHOGENESIS OF TUBERCULOUS OCULAR MANIFESTATIONS

(With one case report)

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The mechanism of the tuberculin reaction and of tuberculin therapy is carefully discussed. A case of uveitis is reported in which the patient, having improved to a certain extent under antiluetic treatment, made a complete recovery only after the addition of tuberculin treatment. Read before the Colorado Congress of Ophthalmology and Otolaryngology, August, 1930.

In a previous paper[1] sixteen cases of ocular tuberculosis were reported and in these cases continued improvement was noted only after the addition of the use of tuberculin. The use of the other forms of treatment had caused only temporary or no improvement.

The controversy as to the benefit of tuberculin and old tuberculous lesions as foci of infection continues and it makes the study into the mode of tuberculous infections very interesting. It is very helpful to understand some of the problems that the investigators take up in their research work, as they try to analyze the cellular changes in primary and secondary tuberculous conditions.

Hamman and Wolman[2] in their textbook on tuberculin therapy have this to say in their discussion of the patients who improve under repeated doses of tuberculin:

"In the majority of cases such a change for the better is associated with the development of a tolerance for tuberculin. This is a clinical fact, whatever our theories may be. We must not blind ourselves to the well attested clinical observation that the average tuberculous patient shows, simultaneously with the improvement under tuberculin, a tolerance for tuberculin by whatever route. This remains a fact generally true, in spite of the citations of individual cases showing departures from this rule and in spite of oscillations of theories of immunity."

In a very comprehensive monograph on the importance of tuberculosis in eye diseases" Urbanek[3] reported five hundred cases of uveitis which he had studied in detail. He found that the large majority responded favorably only to tuberculin treatment.

He also pointed out that there is no typical clinical or pathological picture that indicates a tuberculous process in the eye. For many years definite clinical pictures were taught to differentiate luetic and tuberculous iritis, but with the careful use of the slit-lamp a clinical difference cannot be shown. Acute iritis due to gonorrhea has had a definite clinical picture which was thought to be specific, but even this picture was reported by Urbanek as typical for some of the acute tuberculous conditions.

In ocular tuberculosis the benign form of tuberculosis is most frequently found, and because the internist works from a different angle there is a difference in the conception of tuberculosis as found by the internist and that found by the oculist.

To protect his work against criticism and to convince others that tuberculosis was an etiological factor, Urbanek had roentgen plates of the chests made before any of the tuberculoprotein injections were given and again afterward, so that the tuberculous foci might be watched for any activity that might be considered due to the tuberculin. He was able to demonstrate tuberculosis in animals injected with the blood taken from some of the patients during the height of a relapse of the ocular pathology.

The manifestations of tuberculosis of the eye cannot be considered as a separate entity, but must be taken up as a general medical problem. The pathology as found in the eye is usually so minute that if a similar area of almost

any other organ were involved it would probably cause no symptoms except slight general malaise and this would respond to rest and a general tonic. But with a one to two millimeter lesion in the macula, optic nerve, iris, or cornea, there is a very rapid reduction in vision, and the patient comes to the oculist at once. This probably is the great reason the problem is of primary interest to the oculist, and the reason the internist cannot grasp our concern.

Rich and McCordock[4], in an article from Johns Hopkins Hospital on the rôle of allergy and other factors of importance in the pathogenesis of human tuberculosis, came to the following interpretation of a general tuberculous infection:

"First, the action of resistance leads to the death of the bacilli. Second, there is an allergic response of the tissues which have become sensitized to the products of disintegration of the bacilli."

These two processes vary with the natural resistance of the patient and the number of bacilli introduced.

Immunity and allergy: The immunity reaction must be differentiated from the allergic reaction before we can go far into the problem. Koch in his pioneer work made notes in regard to these different factors and seemed to understand them.

What has been shown by many workers is thus stated by Rich and McCordock: ". . . by administering repeated, increasing doses of tuberculin to the allergic human being, a tolerance or, more probably, a desensitization to tuberculin may be established to such a degree that the individual becomes able to tolerate relatively enormous doses without inflammation, necrosis, or constitutional symptoms. . . . allergy is a separate function. . . . If therefore, resistance is independent of allergy, the reduction of the necroticizing effect of hypersensitiveness to the bacillary proteins could easily be understood to be beneficial. When we realize that tissue necrosis in tuberculosis is almost entirely the result of allergic hypersensitiveness to tuberculoprotein, it becomes clear that the correct interpretation of the significance of allergy in relation to immunity may be a matter of considerable importance. If allergy is not necessary to resistance, one of the best things we could do would be to desensitize the body and so free the tissues from the danger of being destroyed by traces of bacillary products."

The tubercle: "The tubercle formation is in itself the most primitive reaction to an invading organism. Certain other organisms as well as the tubercle bacilli injected into the lower animals below the level at which a vascular circulatory response can enter in, call forth, before any necrosis, phagocytosis, with a central giant cell and true tubercle formation. Tubercles can be formed independently of blood vessels in any tissue in which mononuclear phagocytes are present, and indeed even in vitro on a cover slip in tissue cultures.

"Tubercle formation is incited by the lipoid extracted from the bacillus, but this lipoid cannot evoke an allergic reaction. For that tuberculoprotein is necessary and it calls forth the allergic inflammatory reaction, but never causes the formation of tubercles. If both are present in the same area (that is, the lipoid extract and tuberculoprotein) tubercles are formed more rapidly than in the normal body, as the tuberculoprotein incites, in the allergic body, a more rapid migration of cells to the spot."

Allergic reactions: "All allergic tissue reactions have the same character regardless of what protein serves as antigen, and tubercle formation is in no sense an integral part of that fundamental type of reaction.

"The diminution of allergy during massive infection is a desensitization phenomenon dependent upon the combining of most of the available antibody by large amounts of antigen liberated into the blood stream."

The original articles should be read and their experiments followed for the many details. They are most illuminating and interesting.

Urbanek quotes Heyman in his early

work in immunizing calves against tuberculosis. He introduced the tubercle bacilli in bags from which the toxins could pass but not the bacilli. He found the surrounding tissue to be of tuberculid structure, composed of epithelioid and giant cells but never tubercle bacilli. He states that Preinct, Heine, Fisher, and Mausar found the same to be true with the tubercle bacilli in collodium bags. Jaffee used tubercle bacilli killed by chloroform and produced the tuberculotoxic changes only.

Rich and McCordock give two formulas which help to illustrate the action of immunity and allergy and also denote the varied tissue reactions.

$R = V \times N$. That is, resistance (R) equals the virulence (V) of the organisms times the number (N) of bacilli introduced.

The lesion (L) will vary according to the virulence.

$$\left(\propto \frac{V \times N \times A}{R}\right)$$

of the organism times the number of bacilli times the allergy as against resistance.

With these two formulas in mind, then tuberculosis cannot be divided into exudative and proliferative as different types of infection, but either may pass into the other, depending on the number of bacilli, their virulence, and the allergy of the individual as against resistance. This has been shown in the laboratory many times by the authors quoted, and to quote them again:

"Tuberculin produces an inflammatory reaction and even necrosis, about existing tuberculous foci elsewhere in the body, and this reaction helps to destroy the bacilli and 'stimulate fibrosis' (the proliferative) if the doses remain small enough, but if too large they can cause extensive necrosis (the exudative type) and a distribution of the process."

Rich states that Zieler's experiments also showed that the tuberculins were only active in the animal sensitized through the tubercle bacilli, and he found tuberculids only in tuberculous patients.

Baldwin[5] in studies on the tuberculin reaction from the Saranac laboratory was able to show in one rabbit that extirpation of the tuberculous foci was followed by rapid loss of tuberculin hypersensitiveness.

Immunity: Rich and McCordock say that "the normal body is resistant to living bacilli, but at the same time this resistant body becomes sensitized to the bacterial products resulting from the death and disintegration of the bacilli, just as the body becomes sensitized to any foreign protein introduced into the tissues."

Mechanism of allergy: Rich and Lewis[4,6], in an article on the rôle of allergy in tuberculosis, sum up the general conception of the mechanism of allergy as a protein-hypersensitive reaction, and the most probable explanation of the allergic cellular damage and inflammation in tuberculosis is that they are the results of an antibody-antigen reaction, in which tuberculoprotein constitutes the antigen, which reacts with an antibody formed during infection."

To apply this explanation or to reconstruct a clinical case as an example, we would have an individual infected with tubercle bacilli probably before the age of 18, in which a resistance or immunity is usually developed, and the tuberculous process becomes quiet, and with the disintegration of the tubercle bacilli a sensitivity to the tuberculoprotein develops.

This patient may go along for the remainder of his life with no other symptoms and at autopsy an old scarred area or calcified gland is found. Another patient may get along nicely for many years, then after extreme exhaustion from almost any cause there may be a lighting up of the old process or a reinfection. And with the disintegration of these bacilli, the allergic symptoms such as iritis, asthma or arthritis may appear, and are called tuberculids. And it is in such cases that a desensitization to tuberculin is indicated.

In those cases which show a massive infection with rise of temperature, tuberculin is not indicated as the an-

tigens from the disintegrated bacilli are combining with the antibodies, and the more liberation of antigen the more intense the reaction in these sensitive subjects, so that any tuberculin would make the condition worse.

But in the presence of the tuberculid conditions the introduction of graduated doses of tuberculin associated with general systemic treatment reduces the sensitivity. Thus a rapid clearing of the inflammatory processes is produced.

Case report: The following case report demonstrates the value of tuberculin:

Mrs. A. S., colored, aged twenty-four years, height five feet five inches, weight 118 pounds, came to the Postgraduate Hospital clinic February 18, 1930, complaining of pain in the left eye and poor vision.

Examination: R.V. 1.5 + 4: L.V. 0.2. R.E. normal. Left pupil 3 mm. with sluggish reaction to light and accommodation. Moderate circumcorneal injection, cornea very steamy. Iris could be seen only from above and appeared blurred and thickened. Anterior chamber deep. Fundus blurred and disc seen with difficulty. Veins seemed dilated. L. Tension 60 mm. (Gradle-Schiøtz).

The impression was of a secondary glaucoma, but undecided as to the primary etiology. Pilocarpine two percent ordered.

Laboratory: Wassermann and Kahn 4+. Otherwise negative.

General examination: One abscessed tooth, which was removed. Otherwise negative.

Treatment: Intensive specific treatment started and miotics used with improvement of vision to 0.6 and lowest tension was 43 in three weeks. A deep root iridectomy was made four weeks after her entrance and ten days after the iridectomy her vision was 1.0 and tension 24, and it remained so for three days. Then her vision was reduced to 0.2 and tension increased to 48 mm.

A week after the iridectomy a few deposits were seen on the posterior surface of the cornea, but no iritic adhesions and after dilatation L.V. O.2 + 1 and tension 43. Pain was intense in the eye for six hours following dilatation of the pupil, then subsided and two weeks after the iridectomy pupil was 3.5 mm., tension 33 mm., and left vision 0.1.

The eye continued to show more signs of inflammation with posterior precipitates increasing and three areas of exudate visible on the iris as fluffy snow balls at the three, four, and eight o'clock positions.

Eight weeks after the intensive antiluetic treatment was started, with the eye definitely worse as to inflammatory changes and a tension of 38, the first diagnostic tuberculin injection was given and a positive reaction was obtained with the 1 mg. dose. With tuberculin treatment the eye began to show continued and definite improvement with a lowering of the tension and on July 16, eight weeks after the tuberculin treatment was started, the vision was 0.8 + 3 and tension 20. The eye was white, posterior precipitates all absorbed and a small fleck only of the largest exudate was present on the iris at eight o'clock, midway between the pupillary border and the limbus. The iris was in good condition, the vitreous showed clear bands, although some cell infiltration anteriorly. Fundus and disc clear. She gained fifteen pounds in weight, and felt fine and was able to work again.

Diagnosis: The final diagnosis in this case was a tuberculous involvement, primarily of the ciliary body, causing an increase in the intraocular tension, and later the iridocyclitis.

This case is similar to one reported by W. H. Luedde, in which the patient, who had a positive tuberculin reaction and Wassermann, improved to a certain extent on the tuberculin, and made a complete recovery only after the addition of antiluetic treatment. The author quotes W. F. Peterson[8] extensively in his early work in the study of resistance to tuberculosis.

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OCULAR TUBERCULOSIS

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The author considers failure with tuberculin therapy to be most frequently due to improper administration. Each successive dose should not be administered until several days after completion of the negative phase of the previous dose. Read before the Colorado Congress of Ophthalmology and Otolaryngology, August 2, 1930.

The literature on ocular tuberculosis has been so completely reviewed by Clapp[1], Wilmer[2], King[3], and Cushman[4], that it is not necessary to review it again at this time.

A review of the excellent articles of the above authors will give a complete résumé of the many articles written on that subject in the past. Needless to say this review will bring about a great amount of disagreement as to the diagnosis, and still more as to the treatment, of ocular tuberculosis.

The greatest controversy is centered about the tuberculin treatment of ocular lesions of tuberculous origin. Where there is so much controversy on a subject as is encountered in tuberculosis, with oculists of such high standing as we find pitted on each side of this question, there certainly must be a reason for this disagreement. Supporting the use of tuberculin therapy we find Bernheim[5], Hippel[6], Meller[7], Novak[8], Wood and Rones[9], Wilmer[2], and Gay[10]. On the other side we find Gilbert[11], Hess[12], and Derby and Carvill[13] denouncing it as not merely useless but positively dangerous. That tuberculin is dangerous when improperly administered, especially in intraocular lesions, is generally agreed; the point of contention then is whether or not it has any therapeutic value. If it has, why should such scholars denounce it? The number of patients treated by each group of observers is too large to be a mere matter of chance. The diagnosis on each side is most likely correct in the great majority of instances. Then why this discrepancy?

In the first place, in ocular tuberculosis (if there are no active lesions, which is usually the case) we are dealing with a very minute lesion that does not liberate a sufficient quantity of tuberculoprotein to build an immunity, or else we are dealing with an anaphylactic lesion in some of the ocular tissues. In either case it is evident that it is necessary to substitute a sufficient amount of tuberculoprotein to build that immunity in an otherwise fairly healthy individual.

To understand the treatment of these lesions, one can readily see that it is first necessary to have a thorough understanding of the underlying principles of anaphylaxis and immunity. Personally, I feel that all the controversy and conflicting results come about because lack of understanding of these principles leads to use of improper methods of giving the tuberculin, rather than because of any defect in the procedure when properly administered.

A great number of oculists who use tuberculin therapy are guided by the circulars put out by the pharmaceutical houses, without giving the subject any further thought. All of these circulars are very misleading when the subject is given more thought, considered on the basis of our scientific knowledge of anaphylaxis and immunity.

If one wishes to sensitize an animal or an individual a large single sublethal dose is given, or else smaller doses are given daily or on every second day. As we know, the negative phase following the injection of a foreign protein lasts two to six days, depending on the resistance of the animal or individual and on the size of the dose given. In order to sensitize we aim to give the succeeding doses during the negative phase.

Many of our oculists who have been using the tuberculin therapy have used an interval of two to four days. If the dose was sufficiently large one can readily see that each succeeding dose

was given in the negative phase and that they were sensitizing their patients rather than immunizing them. To give it at such a short interval it would be necessary to make the dose so small that it would be of very little or no value. However, even with a moderate dose, a few patients improved; those were the patients who had a short negative phase and a fair resistance, the dose having been small enough for the succeeding doses to be given early in the positive phase. All of the patients who had a long negative phase were given the succeeding doses in the negative phase, so that instead of increasing the immunity of the patients the physicians were further sensitizing them.

Giving large doses in the negative phase accounts for the complete failures and disasters that some of our oculists have encountered. If they would only make the interval longer, or the doses smaller, they would get uniformly better results. On the basis of our knowledge of the opsonic index you can see that it is possible to give such a dose at such an interval that the patient will remain stationary as far as the opsonic index is concerned. One can readily see that it is more important to use a longer, properly controlled interval with a moderate size dose than to make the interval short and thus necessitate so small a dose that it will be of no value at all, thereby losing much valuable time.

Tuberculin therapy is not a cure-all. Well do I realize that there are a certain number of cases that will recur in spite of all our efforts, but we have no form of therapy that is perfect and tuberculin is no exception. In my experimental and clinical work I have come to the conclusion that artificial immunization is a transient process and that it does not last more than three years in a great many individuals. But if we can bring about an immunity that will give our patient a chance to tide over a period of depressed vitality we have done that patient an important amount of good. That is well borne out by the great number which I have so treated who have never had a recurrence of the process. On the other hand, I had a case that had five recurrent attacks, these usually coming on after undue exposure or overexertion.

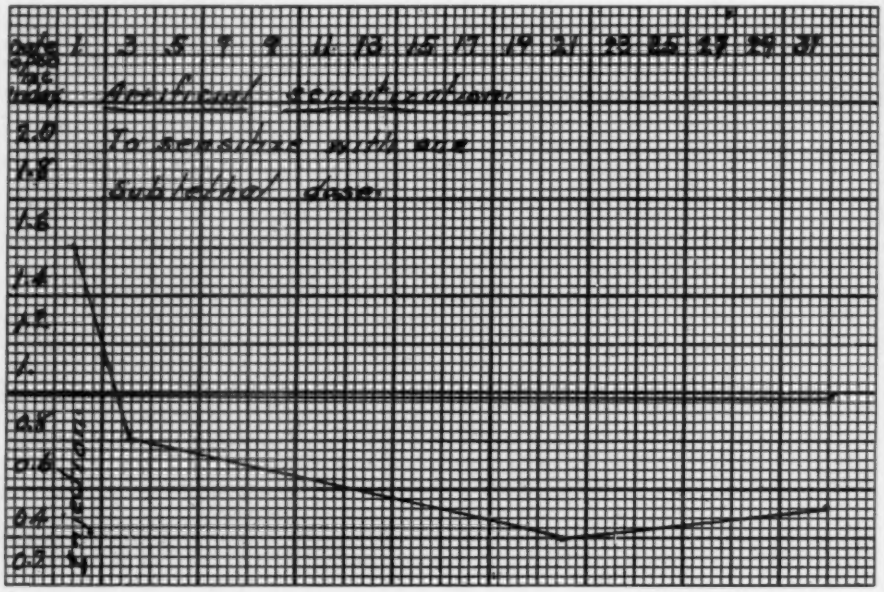

Fig. 1 (Lemoine).

Each time, when this patient had a recurrence, I found that he was sensitive again to the tuberculin test in a much smaller dose than that given at the end of the previous course of treatment. The reason for this transient immunity, I feel, is to be found in a disturbed endocrine balance: these patients again become anaphylactic because of deficiency of some of their internal secretions, much in the same way as they do to many other foreign proteins.

Disturbance of these internal secretions is frequently only temporary, for example, during certain periods such as puberty or the menopause. The endocrine disturbance is sometimes due to emotional causes, such as death in the family, domestic incompatibilities, or financial reverses. After the storm has passed, the internal secretions frequently again assume a normal function and the natural immunity is maintained. When such patients develop a tuberculous condition of the eye they are prone to lose the eye. With tuberculin therapy, if we are able to arrest the disease for two or three years, we have given that patient a chance to restore his normal functions; we thereby improve the mental state and help the patient to overcome the period of readjustment or emotional disturbances.

Before making the diagnostic tuberculin test it is first necessary to eliminate lues and any foci of infection and to have the patient examined for any possible active pulmonary tuberculosis or other active tuberculous lesions. Should the patient have a temperature of over 99 degrees, it is unsafe to give the test; in fact I have my patients wait until they have a normal temperature before I attempt to make the tuberculin test. When possible it is best to hospitalize the patient for the test and for the earlier treatments. Then give an intracutaneous injection of tuberculin, beginning with say 0.0001 mg., of O.T.; if no reaction results in forty-eight hours give 0.001 mg., then 0.01 mg., then 0.1 mg., and then 1.0 mg. In looking for a reaction it is necessary to observe the temperature every four hours for twenty-four hours before giving the tuberculin; after the test the temperature should be followed for at least seventy-two hours in the same

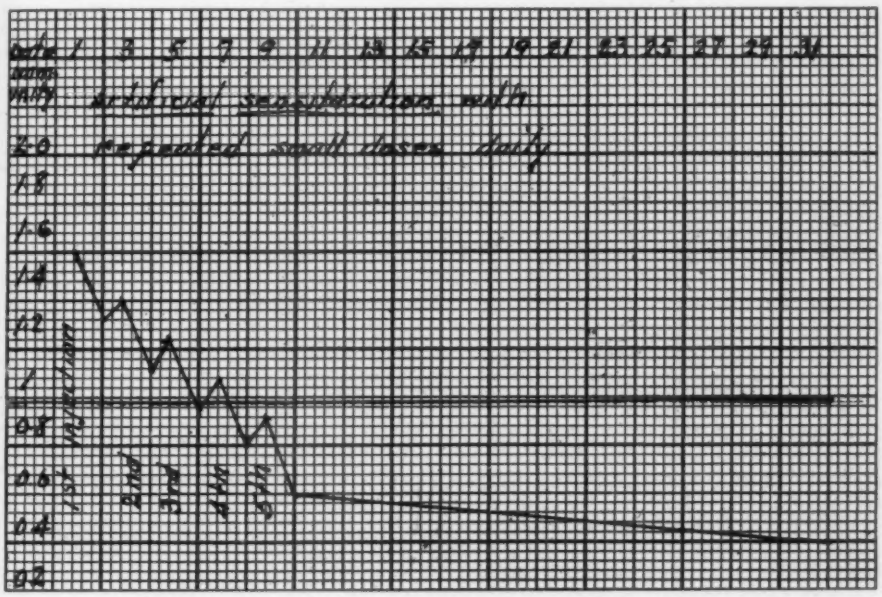

Fig. 2 (Lemoine).

manner, carefully observing the lesion and the sight of injection. If there is no increase in the temperature and no focal or local reaction with 1.0 mg., I feel that it can safely be said that the lesion is not tuberculous in origin.

The first immunizing dose should be about one-half of that which gives the first mild reaction. The doses should then be increased about ten percent each injection at seven-day to eleven-day intervals, depending on the length of the reaction following the injection. This increase is made providing it does not give a focal reaction or does not increase the temperature to over 99 degrees; should the temperature go above 99 degrees, the dose should not be increased, but should be kept the same or diminished. These injections should be continued in necessary doses until a milligram gives no reaction. In some instances it is necessary to continue until a five mg. dose gives no reaction. One should aim never to let the temperature reaction go over 99 degrees, and should completely avoid a focal reaction.

In conjunction with the tuberculin therapy, the patient should be handled in the same manner that any active tuberculous patient would be, that is, provide good nutritious food with a high vitamin diet, and as much sunshine and fresh air as possible.

In the past seven years I have had twenty cases of phlyctenular keratitis that I concluded were tuberculous in origin; among these I have had only one recurrence in the cases immunized with tuberculin, while I have had five cases with recurrences among those I did not immunize. The cases I immunized were all severe cases, because I do not believe that it is necessary to immunize the mild cases, for they will usually get well with the ordinary hygienic measures and local treatment.

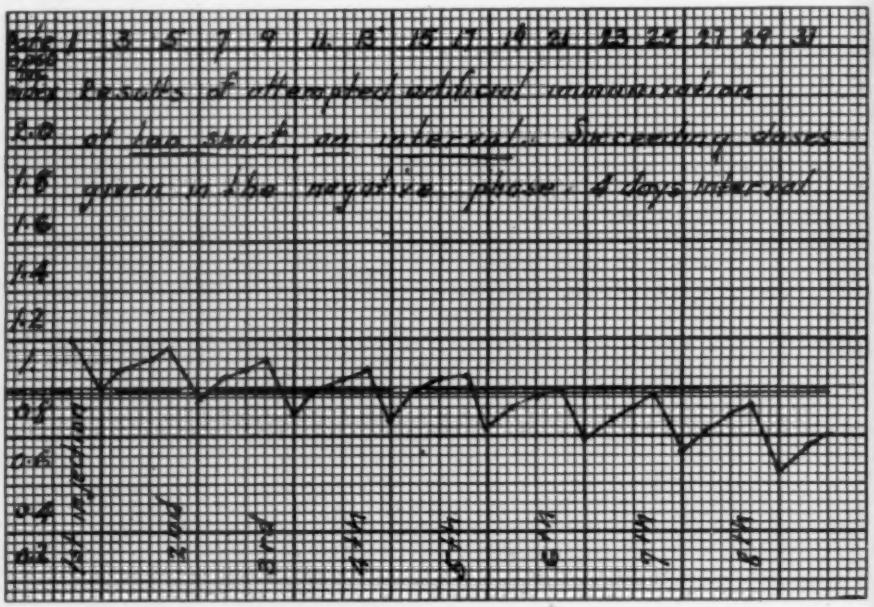

Fig. 3 (Lemoine).

Three cases of tuberculous interstitial keratitis have been treated with tuberculin. One patient who had the disease for one year has made a complete recovery; there have been no recurrences since the treatment, which was given in 1925. Another patient had had the disease complicated by uveitis for over two years. This patient had no recurrence of the keratitis, but had a recurrence of the uveitis following an operation three years later. This is the case

mentioned under uveitis. The last case was a monocular interstitial keratitis of five years standing; all this time the patients had been treated for syphilis by several different oculists, but she was getting gradually worse. With tuberculin therapy the patient made an uneventful recovery and now has 20/100 vision, with no recurrences in two years.

Four cases of anterior nodular scleritis have been treated with tuberculin, none of which has had a recurrence; few of which were treated with tuberculin. Quite a number have had recurrences, but unless these were rather severe I did not feel that the therapeutic measure in question was justified, as the ailment gave very little discomfort and the danger of its impairing the vision is practically nil; consequently I have immunized only three such cases, all of which were severe, with frequent recurrences. None of those immunized have had recurrences since the immunization.

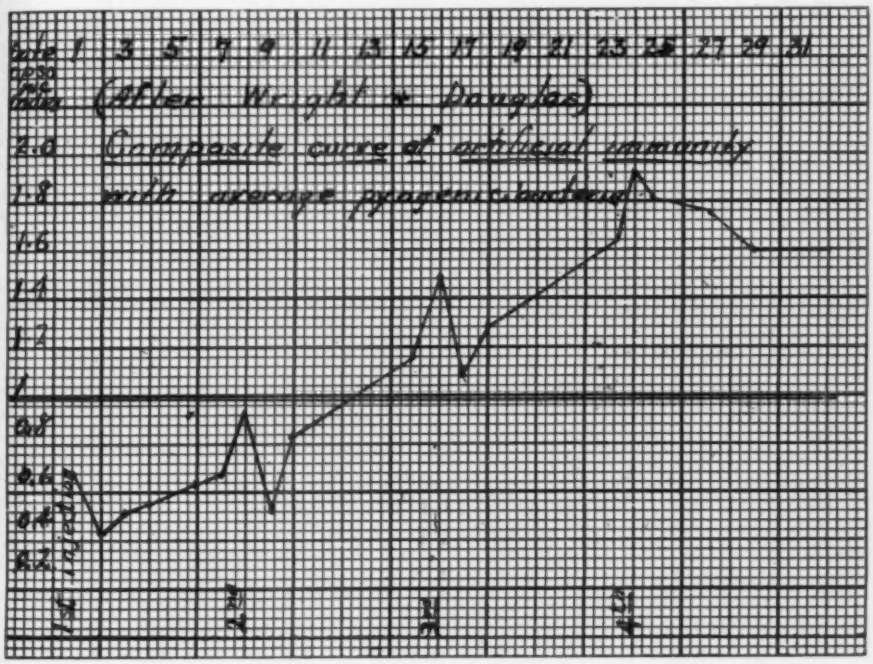

Fig. 4 (Lemoine).

each had had several previous attacks.

Three cases of sclerosing keratitis were treated; one had had it, more or less active, for fifteen years. After the third injection the eye became more comfortable than it had been for several years. During the treatment this patient developed a cold which caused a relapse that lasted nearly a week. There have been no recurrences since. The other two cases were much milder; neither of them has had a recurrence since the treatment.

I have had a great number of cases of phlyctenular conjunctivitis, very

Fifteen cases of tuberculous uveitis were immunized, all of which had had one or more recurrences and all of which were rather severe. Of these only one has had recurrent attacks. Only one of the others has had a recurrence. This was a patient that also had a tuberculous interstitial keratitis mentioned above. This patient had a high myopia. The patient had complete posterior synechias with a pupillary membrane when I first saw the case. This patient had a combination of interstitial keratitis and iritis; the vision when first seen was movement of

the hand at one foot. The basal metabolic rate was minus eighteen. This patient was given thyroid extract and tuberculin therapy. Finally after prolonged treatment the vision with correction was 20/200. This patient had no recurrence for three years. Then another oculist advised removal of the lens in order to get rid of the opaque anterior capsule and to correct the high myopia. When this was attempted an iritis developed; it was treated as an ordinary iritis and the eye went on to phthisis bulbi. Had this patient been immunized again before operation the results might have been far different.

The results in the neuroretinal lesions were equally good, when considered on the basis of the existing lesions found. In none of the cases did the lesion get larger, and in all of them the lesion healed without new diseased areas developing.

One patient, with a macular lesion that had completely destroyed the macula of the right eye, had a small lesion beginning in the left macula. The lesion of the left eye did not spread after beginning the treatment; this patient finally was given 1 mg. of O.T. without any reaction. The vision when the patient was last seen, sixteen months after beginning the treatment, was still 20/20 in the left eye. This patient had a very long negative phase lasting six or seven days. It was necessary to give the tuberculin at intervals of ten to twelve days. The other four cases were: two of the optic nerve and two in the region of the macula. In each the lesion was large when the patient was first seen, and all had marked impairment of vision, but no lesion advanced after instituting the tuberculous treatment.

Conclusion

1. Failure with tuberculin therapy is most frequently due to improper administration, that is, the intervals of the treatments are not properly regulated for the size of dose given.

2. The interval of dosage varies with each individual; each subsequent dose should not be used before three or four days have elapsed after the negative phase has terminated. The end of the negative phase varies from the second to the eighth day after injection, making five days the shortest possible treatment interval, and the longest twelve days.

3. From the foregoing discussion it seems quite evident that tuberculin, when administered in the proper dosage in the positive phase, is a valuable therapeutic agent, especially if the patient is also submitted to the proper hygienic measures and local treatment.

1100 Rialto building.

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SOCIETY PROCEEDINGS

Edited by Dr. Lawrence T. Post

CHICAGO OPHTHALMOLOGICAL SOCIETY

December 15, 1930

Dr. Harry S. Gradle, president

Dislocation of both lenses

Dr. H. J. Smith presented a woman thirty-eight years of age, with complete prolapse of the right lens into the anterior chamber, and partial luxation of the left lens. Secondary glaucoma had developed in the right eye and the lens was removed. Vision was 8/10 in the left eye, with correction. In the right eye there was hemorrhage into the vitreous; no useful vision was obtained. The only history which might have a bearing on the condition was of a fall which occurred about a year ago. Dr. Von der Heydt had suggested that examination of the left eye might be made with the patient lying on her back and the pupil dilated. Probably nothing could be done for the right eye on account of the likelihood of detachment of the retina.

Bulging of the iris

Dr. Chester H. Lockwood presented a boy eighteen years of age, who had always been near-sighted. Three or four weeks ago vision in the right eye had begun to fail, due to a cataract. The case was rather odd in that the central one-third of the iris took a sharp forward bend in the region of the circulus iridis minor, the peripheral two-thirds being normal. Vision was light perception and projection, fairly good only on the temporal side. Vision in the left eye, with correction, was 6/10. Tension (Schiøtz) R.E. 5, L.E. 18 mm. Possibly the peculiar bulging of the iris in the right eye was caused by the swollen lens, which in turn was pulled back by decreased intraocular tension, or from vitreous changes.

Discussion. Dr. George F. Suker suggested that the cataract should be allowed to remain, for the reason that the underlying retinal detachment would nullify results. Should glaucoma supervene, however, then an appropriate glaucoma operation could be undertaken in preference to any surgical measures directed to the lens. A cataract extraction in this stage would be disastrous. Such cases often necessitated enucleation.

Posterior lobe tumor

Dr. George F. Suker presented a young man first seen on April 4, 1930. Examination at that time showed blind spots enlarged, discs hazy, vessels dilated, and vision normal in each eye. There was a slight trace of albumin in the urine; no complaint of headache, vertigo, vomiting or dizziness; all reflexes normal. It was thought to be a case of hypertension because of hyperemia of the disc and of the retinal capillaries. At this time he was treated by a rhinologist for sinus disease.

When seen again, December 10, 1930, the blind spots were markedly enlarged and vision reduced (20/40); bilateral papilledema of 1.5 to 2 mm. was present, with involvement of the fifth and seventh cranial nerves and facial anesthesia on the right side. He complained of dizziness and occasional headache. There had been no vomiting, no albumin in the urine, and the blood pressure was not elevated but the pulse was rather slow. His hearing tests by Dr. Alice K. Hall showed spontaneous nystagmus to the right, total absence of response to caloric stimulation in the right labyrinth and moderate middle ear deafness.

This case was first diagnosed as simple hypertension because of the findings at the time, but on the patient's return some months later there was undoubted evidence of posterior lobe tumor. This illustrated how long a swelling of the disc could exist without marked reduction of vision. It was

rather characteristic of cerebropontine tumor, particularly if of slow growth, to give the symptoms in the beginning of simple hyperemia of the disc, and not unusual to have an albuminuria and no other symptoms pointing to a brain tumor.

Sarcoma of the choroid

DR. GEORGE F. SUKER presented a man sixty-one years of age, with failing vision in the left eye since last May. He had his glasses fitted by an optician who told him he would require frequent changes to correct the vision. When first seen a large sarcoma of the choroid was noted on the nasal side of the left eye near the anterior vena vorticosa, the most dangerous spot for metastasis. As the patient looked to the left, engorged conjunctival vessels which showed a marked compression, if not early metastasis, were seen. Pigment migration was already occurring in the vitreous and there was a pigment halo about the sarcoma, and the consequent retinal detachment. The most dependent portion of the tumor was almost on top of the vena vorticosa. By transillumination the tumor was absolutely opaque. Vision was 20/30. The patient hesitated to have the eye enucleated.

Mauksch operation for chronic glaucoma

DR. LENNON (senior resident physician, Cook County hospital) presented a woman first seen at the Cook County hospital on September 1, 1930, on Dr. Suker's service. Vision in each eye was hand movements at two feet. The right eye showed occlusion and seclusion of the pupil; tension 50 mm. (Schiøtz). In the left eye there was occlusion of the pupil; tension 60 mm. After observation for twenty-four hours and an unsuccessful attempt to dilate the pupil, Dr. Suker performed a Mauksch operation on the left eye. The right eye was later enucleated because of pain. The left eye now had vision of 5/10—2, uncorrected; tension was 20 mm., and had remained so for the past four months.

Autopsy findings in a case of chloroma

DR. T. SHAPIRA, from Dr. Gradle's service at Michael Reese Hospital, reported the case of a four-and-one-half-year-old boy who was admitted to the pediatric service with a history of fever, and pain in the joints and legs for a period of three weeks. There were ecchymoses of both eyelids. Blood tests showed secondary anemia, hemoglobin 40 percent. X-ray plates of the bones showed periostitis. The maxillary antra were hazy. Following drainage of the antra, extensive ecchymosis developed in the upper and lower lids of both eyes, and an exophthalmos of the right eye which had been noted upon admission became more pronounced. Upon examination by the ophthalmological department, diffuse ecchymoses were noted on both sides, some suggestion of light pressure on the right nerve head, and pallor of both discs. About four days later there occurred marked proptosis of the left eye, with chemosis of the conjunctiva. The eyeball was pushed forward out of the orbit. A diagnosis of chloroma was made. The child died November 22nd. At autopsy marked involvement of all the bones was found. The outstanding feature was the predominance of basal cell lymphocytes. Most of the tumor masses were dark gray in color, but one green mass was found in the peridural space, diagnostic of chloroma.

Discussion. DR. RICHARD GAMBLE thought there was no question as to diagnosis. Most of the tumor masses were not green but that did not rule out chloroma. Some cases were reported with grayish masses only. The color was not permanent; it faded out on exposure to air. It was a good plan to make an oxydase test of the blood; the ordinary blood count was not sufficient. In the average case the count might be as high as 50,000, but Dr. Bedell had reported a case with a white count of 6,200, and some had been reported as high as 1,800,000. The oxydase test indicated whether the cells were granular or not, and whether of lymphatic or myeloid type.

DR. ROBERT VON DER HEYDT presented

a series of fundus photographs taken with the new reflex-free Zeiss-Nordensen camera.

The Mauksch filtration operation for chronic glaucoma

Dr. George F. Suker presented a paper on this subject which will be published later in the American Journal of Ophthalmology.

Discussion. Dr. Oscar Dodd asked how adhesion of the base of the iris to the cornea in chronic glaucoma could be separated without tearing the iris loose from the ciliary body.

Dr. Chester Lockwood had not performed this operation but was interested in Dr. Suker's statement that iridectomy should not be done in any case of chronic simple glaucoma. What was the reason for that statement?

Dr. Harry Gradle asked what effect this operation had upon the visual field of chronic simple glaucoma. In simple glaucoma where the visual field was cut within ten degrees of the fixation point, operation upon the iris would frequently cause the blind area to swing over fixation. Was this operation free from that danger? He did not understand how it functioned as suprachoroidal drainage. The origin of the incision was 5 mm. behind the limbus; the choroid did not start until a point 9 mm. behind the limbus. Consequently the incision was over the ciliary body and not into the suprachoroidal spaces. The benefits of cyclodialysis resulted from atrophic disturbance of the ciliary nerve with subsequent lessening of secretion from the ciliary body. It was not believed that a cyclodialysis opened up the drainage angle for filtration, in view of the fact that it did not come next the suprachoroidal space but remained near the sclera. Was it not possible that the effect of cyclodialysis was due to destruction of the nerves by the sweep of the spatula, thus permitting drainage? As for the effect of twisting the iris, no comment could be made on that until there had been some histological corroboration.

Dr. Louis Bothmann said that in this operation the sphincter of the pupil was included in the cicatrix when the wound healed. Following cataract extractions when the sphincter was included in the cicatrix the entire lower half of the iris might be pulled up to such an extent as to occlude vision entirely and a new pupil must be made. Had the lower border of the iris been displaced upward beyond the center of the cornea in any of these cases?

Dr. Robert Von Der Heydt thought raising of the pupil would be a decided advantage in creating drainage, because it lifted the lower half of the iris. Its action there was similar to the effect of a permanent miotic. He asked how the forceps could be opened sufficiently to grasp the iris within so narrow a cut; it was fully 10 mm. within the eyeball when it reached the pupillary border of the iris.

Dr. Charles G. Darling said that a number of years ago at the Cook County hospital Dr. Brown had had a case in which the eye was going to enucleation on account of absolute glaucoma. It was painful and blind. An iridectomy was tried to see if the root of the iris could be reached by doing a cyclodialysis, introducing a forceps and grasping the margin of the pupil. This was unsuccessful, and the angle was such that considerable pressure was put on the ciliary body, therefore the forceps was withdrawn. It was thought that enucleation was necessary, but the tension went down and remained at about 15 to 20 mm. the balance of the time the patient was in the hospital. Unless the forceps was bent to follow the curve of the eye, it would seem impossible to avoid injury to the ciliary body, and in that case it was probably the injury to the ciliary body that reduced the tension.

Dr. William F. Moncrieff said that there were several possibilities regarding the mechanism of reduction of tension following this operation. One was that filtration might occur through the chamber angle, if the iris which was withdrawn maintained the position in which it was placed, inasmuch as this part of the iris insured a permanent separation between the root of the iris

on the one hand and the trabeculum and posterior surface of the cornea on the other.

The second possibility concerned suprachoroidal filtration, which appeared to be hypothetical, inasmuch as there was no definite proof or disproof of its existence. The mere fact that the scleral incision lay anterior to the ora serrata and that no surgical detachment of the choroid was produced did not exclude the possibility of suprachoroidal filtration, as this space was anatomically continuous from the scleral ring anteriorly to the scleral ring of the optic nerve canal posteriorly.

A third possibility was that mentioned by Dr. Von der Heydt that the upward traction on the iris might open the chamber angle in its lower portion.

The chief technical difficulty in the operation would appear to prevent the iris retracting again into its normal position. Unless it maintained its new position, there could be no expectation of a permanent reduction of tension.

Dr. Suker (closing) said, in answer to Dr. Dodd, that the point was fairly well demonstrated in the case shown this evening. The iris was approximated against the posterior surface of the cornea. If the anterior chamber was reached the iris was easily grasped. It was not always an adhesion—more of a coaptation.

In reply to Dr. Lockwood: An iridectomy was not advisable in chronic glaucoma because in the majority of cases it led to further disturbance, principally optic atrophy. That had been his clinical experience. In filtration operations, if the iris presented itself as it frequently did in a trephining, it was necessary to do an iridectomy. The original Elliot trephine operation was done without an iridectomy. One should be constantly in contact with the under surface of the sclera and slide over the ciliary body. When the blade was in the anterior chamber it should be depressed so as not to injure the posterior surface of the cornea. The blade used had a dull edge. The cyclodialysis was about six to eight mm. wide, and the entrance at the sclera was only about 4 mm.

In answer to Dr. Gradle: cyclodialysis did not depend upon local destruction of the ciliary body for lessening the secretion. It had not been clinically proved that the ciliary body secreted. The choroid did extend farther forward than Dr. Gradle maintained, and the ciliary body and processes were but a continuation of the choroid. If there were two pigmentary surfaces or layers adjacent a drainage could be established, as there was always microscopic filtration.

No operation on the iris could be performed without displacing the pupil more or less; it was raised about 1 to 1.5 mm. in all these cases. Dr. Von der Heydt's point as to a displaced pupil being more of a benefit than otherwise was well taken, and no doubt traction from below upward was a good thing so far as it aided in keeping the angle open. There was no difficulty in getting hold of the iris; the internes performed the operation frequently and if a junior interne could do it there was no great difficulty. If the iris forceps was bent at forty-five degrees and ran parallel with the curve of the globe, the iris could be picked up nicely.

Robert Von der Heydt,
Secretary.

NASHVILLE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

December 15, 1930

Dr. Hilliard Wood presiding

Bilateral hemorrhagic glaucoma

Dr. Hilliard Wood presented the case of Mrs. H. L. G., aged sixty-one years, seen on September 2, 1930. She complained that her vision was failing and she wanted her glasses changed.

Examination showed: R.E.V. 20/200; accepted no lens. L.E.V. was 20/30; with +0.50 sph. V. was 20/25. The right eye showed a diffuse hemorrhagic retinitis; the left eye a few ret-

inal maculæ, no hemorrhages. Septic faucial tonsils were found. Blood pressure was 200/100. Urine was negative for sugar and albumin. Blood Wassermann was negative.

Treatment was removal of tonsils. The patient was placed on mercury and iodide of potash. On September 15, the patient developed pain in the right eye; tension was 35 mm. of mercury; pupil dilated. Left eye tension was 17 mm. of mercury. Eserin and pilocarpin were used in the right eye without contracting the pupil or relieving pain.

On September 17, iridotasis was performed on the right eye. Pain in the right eye was relieved. September 22 the tension in the right eye was 18 mm. of mercury. October 7, right eye tension was 33 mm. of mercury. Eserin and pilocarpin were used without relief of pain. October 13, right eye tension was 49 mm. of mercury; left eye tension was 42 mm. of mercury. An Elliot trephining was performed at the outer margin of the right cornea. On the left eye trephining was done with complete iridectomy.

October 18, right eye tension was 9 mm. of mercury, vision nil. Intraocular hemorrhage; left eye, too soft to register with tonometer, vision perception of light, intraocular hemorrhage. Both eyes were lost.

The patient gave no history of being a bleeder; the tonsillectomy was not followed by undue bleeding; the iridotasis on the right eye was not followed by intraocular hemorrhage, but was followed by a return of hypertension, and the second operation on the right eye was followed by intraocular hemorrhage. There was no history nor evidence of intraocular hemorrhage in the left eye at the time of operation and this eye had fairly good vision until a few days before the trephining.

Discussion. Dr. W. G. Kennon remarked that the hemorrhagic glaucoma might have been due to thrombosis of the central vein. He had seen definite cases of glaucoma due to thrombosis of this vein. He also had observed that the eye with the lowest tension was usually prone to hemorrhage. He had a case with nephritis which developed glaucoma. The tension was reduced by eserin and pilocarpin and the patient promptly developed all the symptoms of albuminuric retinitis. Dr. Wood's case was somewhat of that character. As soon as he relieved the pressure, the blood vessels ruptured. If he had not relieved the pressure the patient would have gone blind with glaucoma.

Dr. Robert Sullivan thought any case of high blood pressure and increased tension that developed secondary glaucoma might later have hemorrhage. Anything might start it, removal of tonsils or of a tooth. He did not mean that high blood pressure caused glaucoma, but it made the patient more liable to it.

Intraocular foreign body: streptococcic infection

Dr. W. G. Kennon presented C. D., white male aged twenty-three years, who had consulted him August 17, 1930. While hammering on a bolt at 2 p.m. the day before, something struck him in the left eye. There was only slight discomfort at the time, and he noticed no blurring of vision. He simply rubbed his eye with his sleeve and continued at his work until the closing hour, 5:30 p.m. About 9 p.m. pain became very severe. At about 2 a.m. he was given morphine one-fourth grain with but slight relief from pain. The patient was seen again at 10.30 a.m., some twenty hours after the injury. Examination at this time showed: right eye normal, vision 20/20; left eye no vision, upper lid slightly swollen, cornea hazy throughout. There was a complete ring of dense haziness around the entire circumference of the left cornea, extending from the limbus about 2 mm. toward the corneal center. There was marked conjunctival chemosis. On account of the chemosis it could not be definitely determined whether or not there was a wound of the conjunctiva, though there was a suspicious area just about the region of insertion of the internal rectus. The

appearance was that of beginning panophthalmitis. The iris was muddy, the pupil inactive; apparently the iris was adherent to the anterior lens surface. X-ray was negative for foreign body. An ophthalmoscopic examination was impossible. The treatment consisted of instillation of two percent atropin, boric acid compresses every three hours, and morphine for the pain. The patient was placed in hospital.

During the period between the time he was seen at the office and at the hospital, one hour, there was distinctly perceptible increase in the corneal haziness and conjunctival chemosis. Twenty-four hours after admission to the hospital the eye was pushed forward by the swollen orbital contents, and was outside the lids. The cornea had apparently sloughed away so that the corneal area appeared as a yellow saucer-shaped depression. The lids were markedly swollen and tense. There was a profuse serosanguinous discharge. The eyeball was collapsed.

Leukocytes were 13,800; temperature 100°. Culture taken from the discharge showed mixed organisms, streptococcus predominating. Two days after admission the condition remained unchanged. The temperature ranged from 99° to 100°. The patient had very little pain. After three days there was no change. On the fourth day there was slightly less swelling of the lids and tissues about the orbit. On the fifth day the swelling was definitely less. The patient was comfortable and cheerful. He had no fever and leukocytes were 8,500. The condition as to swelling of lids and so on gradually improved. It was decided to do an evisceration of the globe nine days after the accident. The reason for deciding on evisceration was that the infection apparently was so virulent that meningitis was feared if an ordinary enucleation was done. When the operation was attempted, the sclera was so friable that any grasp with forceps promptly broke through. It was thought that the sclera would slough following operation and enucleation was therefore done. This was accomplished with great difficulty on account of the friability of the tissues and the adhesions between the globe and orbital contents. No attempt was made to suture the conjunctiva.

The patient had a prompt and uneventful convalescence. An x-ray picture of the eyeball after enucleation showed two pieces of steel.

Discussion. Dr. Robert Sullivan, who had seen the patient in consultation, said this was the most unusual case he had ever seen. Either the man had no resistance, or else he had the most violent form of infection that could be imagined.

Dr. Hilliard Wood asked for the opinion of the members with reference to enucleation in panopthalmitis.

It was the general opinion that it was best to wait as long as possible before removing an eye with acute symptoms. Only one member had ever seen meningitis following enucleation.

H. C. Smith,
Secretary.

NASHVILLE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

January 19, 1931

Dr. Hilliard Wood presiding

Style in lacrimal duct for twenty-five years

Dr. F. E. Hasty reported that Mrs. W. W. N., aged thirty-five years, had come to him October 3, 1930, complaining of pain and discharge in the right ear of two months' duration. Hearing in the right ear had not been normal since the patient was nineteen years of age, at which time she had palsy of the right side of the face which lasted a few days.

Examination of the right ear showed suggestions of a tuberculous condition of the mastoid. X-ray of the mastoid and of the paranasal sinuses demonstrated a style in the right nasolacrimal duct.

Dr. H. C. Smith, by request, had examined the patient's eyes on October 3,

1930. There had been tearing of the left eye and continual discharge of pus from a small fistula below the inner canthus since the patient was four years of age, at which time she had acute dacryocystitis. At seven years of age a silver style had been placed in the left nasolacrimal canal; the patient wore this until the age of eighteen years, at which time it was discovered that the tip of the style was no longer visible at the lid margin and the supposition was that it had slipped entirely out. A series of probings was done without improving the epiphora.

Several years afterward an operation for removal of the left lacrimal sac was performed. Following this, the fistula reappeared and the symptoms returned. One year later, another operation for removal of the lacrimal sac was advised, but the patient refused.

On examination, October 3, 1930, there was a small fistula 6 mm. below the inner canthus of the left eye, through which mucopurulent material could be expressed. The canaliculus had been slit. There was no external evidence of the presence of the style in the lacrimal canal.

The style was removed through the fistulous opening.

On January 13, 1931, when last examined, the patient had no epiphora, and there was only slight lacrimal discharge from the fistula.

H. C. SMITH,
Secretary-treasurer.

KANSAS CITY SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

December 18, 1930

DR. ROBERT FORGRAVE presiding

Incipient cataract

DR. ROBERT FORGRAVE of Saint Joseph, Missouri, speaking on this subject, stated that in this condition chronic focal infection was very common, and that the question was even being raised whether there really was such a thing as senile cataract. He quoted Dr. Frank Wilson Dean of Council Bluffs, Iowa, as using subconjunctival injections of cyanide of mercury; but this should not be used in nuclear cataract nor in patients with poor nutrition. He also quoted Dr. Harry Gradle of Chicago as saying that no treatment was efficacious but that iodine salts should be used internally as well as locally. Dr. Forgraves said that he had used mercury cyanide as well as dionin but that one should not promise results.

Discussion. DR. H. B. DAVIS stated that in some cases early treatment with dionin and subconjunctival injections of cyanide of mercury gave good results.

Styes

DR. F. C. BOGGS of Topeka, Kansas, said that the literature was, peculiarly, very limited on this subject but that with the laity superstitions were many. There was frequently an underlying physical disability such as tuberculosis, anemia, or diabetes. Sometimes hordeola were caused by chronic inflammation of the contiguous organs such as the nose, throat, or sinuses. Errors of refraction seemed to have some casual relationship but were certainly not the sole etiological factors.

Treatment was both general and local, and it was important to stress hygiene. Attention should be given to exercise and diet. Sweets and starches should be reduced to a minimum. Sixty to fifty percent alcohol and tin chloride gave good results locally.

Discussion. DR. H. B. HENDRICK said that many different methods of treatment must be used, depending on the individual. He also stressed focal infection as an etiological factor and said that the vitamin intake was important.

DR. ALBERT N. LEMOINE said that general care was important and that some cases were limited to the follicles of the cilia. This was usually a low grade staphylococcus infection and for these cases a five percent silver nitrate solution applied to the lid margins often gave good results.

DR. ALVIN J. BAER mentioned autogenous vaccines as helping to clear up some of the more aggravated cases.

Itching lids

Dr. E. S. Ferguson's paper on this subject was read by Dr. Dolph D. McHenry of Oklahoma City. This paper stated that itching of the lids was a symptom of a great many diseases, including dermatitis, allergy, blepharitis, and conjunctivitis.

Discussion. Dr. Albert N. Lemoine said that in this part of the country the most common cause of conjunctivitis was the Morax-Axenfeld bacillus, for which zinc should be used. He also said that he believed that endocrine disturbances had some influence in many of these ocular disorders and he was using calcium parathyroid and thyroid.

Alvin J. Baer,
Recorder.

THE COLORADO OPHTHALMOLOGICAL SOCIETY

December 20, 1930

Dr. James M. Lamme presiding

Plastic repair for ectropion

Drs. W. C. Finnoff and J. L. Swigert presented L. H., aged eighteen years. On January 24, 1930, the patient fainted and fell on a hot stove, causing a second degree burn involving the right side of the nose, the right supraorbital and infraorbital regions from the inner to the outer canthus, and the outer area of the right upper lip. The eyeball itself was not injured.

The burn was treated by the family physician. Erysipelas developed one week later in the burned area and the patient was taken to the Colorado General Hospital, where the erysipelas improved. The burned area healed with marked ectropion of the right lower lid and distortion of the outer angle of the mouth.

In July a rectangular area was grafted on the right cheek with skin from the chest. This healed without complications. In September the right side of the nose and the supraorbital region were grafted. The graft for the supraorbital region was taken from the axilla, and contained sufficient hair to form an eyebrow. This also healed without complication. These operations were done by the surgical service.

In November the patient was transferred to the eye service, where the infraorbital region, including the inner canthus, was repaired with an epidermal graft. After freeing the lid margin and removing the scar tissue, the lids were brought together by a Wheeler tarsorrhaphy and apposition maintained by three bridges of tissue. The entire graft took.

Dr. Finnoff reviewed the points of interest in this case. The superiority of the epidermal graft over the Wolfe graft was mentioned. The epidermal graft was best taken from the inside of the thigh. All scar tissue was removed and hemorrhage was controlled by pressure. The graft was held in place by dental molding compound and a firm pressure dressing.

Retinitis proliferans of unknown etiology

Dr. R. W. Danielson (by invitation) presented a girl aged nine years from the outpatient department of the University of Colorado medical school. She was brought to the clinic in April, 1930, because of poor vision. Since the girl was not under parental care, little could be obtained regarding the family history except that the father was definitely syphilitic.

On admittance the following tentative diagnosis was made: bilateral posterior polar cataract; bilateral persistent hyaloid vessels; proliferating retinitis; hemorrhagic retinitis. Vision O.D. was 0.2, vision O.S. light perception. Wassermann tests of the blood and spinal fluid were negative. The Pirquet test was negative and the roentgenogram of the chest revealed no pathology. The pediatric department could find no evidence of syphilis or tuberculosis. The blood chemistry, urinalysis, and blood count were normal.

The condition had remained unchanged except that there now appeared to be a small retinal detachment in the right eye nasally and that the

cataract had progressed in the left eye. The case was presented to get suggestions as to etiology.

Discussion. DR. DONALD H. O'ROURKE thought that clinically, in spite of the negative Wassermann test, the case strongly suggested the possibility of lues, so that antiluetic treatment should be instituted.

DR. W. C. FINNOFF believed that the child was luetic and that the condition described as a detachment was probably not a detachment but an exudation.

Simulated loss of vision

DR. WILLIAM H. CRISP reported the case of a boy aged eleven years who had been injured in an automobile accident. His parents were attempting to obtain damages on account of the boy's supposed loss of vision. There had been a fracture through the left parietal region, but no direct injury in the vicinity of the eyes. For some time the best vision admitted for either eye, with or without correction of a low hyperopia, was about twenty-five per cent of normal. The boy's responses also simulated a very decided loss of accommodation. External and ophthalmoscopic examination of the eyes failed to disclose any pathological condition. Tests at various distances showed moderate inconsistencies in visual acuity and the boy's replies suggested he had had careful coaching. After several successive examinations he was made to admit visual acuity of 20/16 and normal accommodation. In such cases it was necessary to watch closely for suspicious responses on the part of the patient, and upon such evidences of deceit it was often necessary and advisable to resort to a judicious amount of "bullying" in order to force important admissions. At one stage this boy gave a decided opening by admitting that he could read the first two or three words of a paragraph on the near point test card but denying that he could read any farther through this paragraph.

Choroidal detachment

DR. W. C. FINNOFF reported regarding Mrs. L. R., aged seventy-five years. After an iridectomy, intracapsular cataract extraction was done November 25, 1930, by the Knapp-Török method, there being no complications at the time of the operation. The eye was dressed on the fourth day, the pupil was black, and there was very little reaction. The fundus was not examined. On the fifth day the fundus was examined and a small choroidal detachment in the lower nasal quadrant was noted. This rapidly increased in size and extent. By December 4th the detachment extended over most of the temporal field and was also present on the nasal side.

On December 11th the detachment had increased above and to the nasal side. With a fine hypodermic needle the sclera was punctured 8 mm. back of the limbus at the lower border of the external rectus and 1.5 c.c. of clear amber fluid was removed. There followed definite improvement in the level of the detachment. On December 12th the sclera was again punctured and 1 c. c. of fluid removed; the improvement continued. On December 13th, 0.75 c. c. was removed. The nasal and upper portion of the detached choroid was in contact with the sclera and only a small detachment in the lower temporal quadrant remained.

On January 3, 1931, the vitreous was slightly hazy; otherwise the fundus was normal. With correction the vision equalled 20/25.

DONALD H. O'ROURKE,
Secretary.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

January 13, 1931

DR. WILLIAM L. HOWARD presiding

Entropion corrected by Webster operation

DR. R. O. RYCHENER presented Mr. J. A. B., aged forty-five years, who a month previously had been operated on for entropion from old trachoma, by the method described by Webster. The result on the right side was perfect but the left lid was still entropic, be-

cause the tarsal incision had been placed 4 mm. from the lid margin instead of 2 mm. as advised by Webster. It was proposed to reoperate in this eye, placing a second graft anterior to the position of the first.

Discussion. DR. STANFORD thought that of all the operations for entropion so far described this seemed to be the simplest, beside affording excellent results.

DR. ELLETT discussed at some length the various operations for entropion and stated that in his hands the methods described by the late John Green and by Webster had given very satisfactory results.

Corrected convergent squint

DR. A. C. LEWIS presented Mr. J. H., aged nineteen years, whom he had first seen December 8, 1930, with vision O.D. 20/100; O.S. 20/30. There was a history of the eyes having been crossed since early childhood. O.D. had forty-five degrees of internal rotation and good muscular action in every direction. Refraction under cycloplegia showed 3.25 D. hyperopia and 1.50 D. astigmatism axis 90° in each eye.

On December 16, 1930, under local anesthesia, a Reese resection of the right externus was done and a tenotomy of the right internus. This produced a good cosmetic effect and corrected the greater part of the strabismus but there remained about fifteen degrees of convergence.

On January 12, 1931, the left internus was tenotomized with complete correction of the deformity.

Discussion. DR. ELLETT thought that this case illustrated the possibility of obtaining better cosmetic results in patients with deep-set eyes. The result here was excellent.

Enucleation following an unusual eye injury

DR. A. C. LEWIS reported the case of G. B., aged forty years, who on December 22, 1930, while working near two other men who were cutting a railroad spike with hammer and chisel, was struck by something in his right eye, causing only slight pain at the time.

Examination December 25, 1930, showed a narrow, white, linear opacity 10 mm. long in the cornea extending from the center outward. The anterior chamber was clear and of normal depth, the iris was cut through from the pupillary border at the nine o'clock position about 4 mm.; the lens was cloudy and showed a dense white opacity on the temporal side. Light perception only remained.

Roentgen-ray examination was negative for a foreign body. The patient was kept in the hospital for observation of further developments. Three days later both the anterior and the posterior chambers were filled with soft lens substance and the eye became painful. Five days after the injury the eye was more painful, the anterior chamber almost obliterated, and the tension high. Removal of the lens substance was attempted by linear extraction. Much of this lens substance was distributed throughout the posterior chamber and was adherent to the iris peripherally and could not be removed by expression or irrigation.

On January 5, 1931, the eye, which had become quiet after extraction of the lens, again became painful and was without light perception. Since it could never be a useful eye, it was enucleated.

The point of interest in this case was that there was no metal in the eye, although a large piece of metal had penetrated cornea, iris, and lens.

Discussion. DR. ELLETT thought that poorer results were experienced in intraocular foreign body cases than in all other eye cases. The roentgenogram did not always localize the foreign body and results from fishing for such bodies in the vitreous were disastrous. The most troublesome cases were those which involved an only remaining eye. He remembered particularly one case in which there was a wound of the cornea and iris and a metallic-looking spot on the retina which might have been a foreign body. There was a history of two separate accidents to the eye, so the spot might also have been the scar of question of entering the globe was de- a previous foreign body. The magnet failed to accomplish anything and the

question of entering the globe was deferred. After many years the patient still had excellent vision although nothing further was ever done.

DR. W. L. HOWARD said that the prognosis in these cases must be guarded, although he had seen many in which good vision remained after removal of the foreign body.

DR. J. B. STANFORD thought this case to be one of lacerating but not penetrating foreign body.

Coloboma of choroid and optic nerve

DR. J. B. STANFORD presented E. J. R. aged five years, whose left eye had crossed since before she was one year old. She fixed with the right eye and her ocular movements were normal. Under atropin it was found that the error of refraction was about 1.5 D. of hyperopia. The right media and fundus were normal. Ophthalmoscopic examination of her left eye revealed a coloboma of the choroid and nerve about four or five disc diameters in size. Inquiry revealed that the mother had always noticed a peculiar "dog's eye reflex" from the left eye since birth.

DR. R. O. RYCHENER,
Secretary.

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WORLD OPHTHALMOLOGY

Among phrases that we often encounter are such as "German ophthalmology", "British ophthalmology", "American ophthalmology". Each of these implies certain national developments in ophthalmology which may be taken to characterize it in other parts of the world. In Germany the emphasis may be on fundamental and philosophic lines of thought, in Great Britain on practical use and adaptation of what is known; in America on the influence of refractive conditions and imperfect motor coördinations, or on the central nervous system. But perhaps some such phrase as "world ophthalmology" is needed to remind us of the vast mass of important knowledge, gained in all parts of the world, that constitutes the ophthalmology of today and furnishes the real basis for present ophthalmic practice.

The scientific proceedings of the Amsterdam Congress of 1929 give concrete expression to the truth that all parts of the world can furnish observations which throw new light on our problems and furnish new inspiration and new methods for their solution. Different nations, like different individuals, may see things differently; and, reporting what they see, may bring individual contributions of high value to our swiftly developing stock of common knowledge. In Switzerland Gonin, influenced by the views of Leber of Heidelberg, and corroborated by those who first learned of his new treatment for detached retina, has almost reversed the prognosis and attitude of ophthalmologists toward that condition.

The full appreciation of what trachoma is and what it does will only be reached through understanding of what is known of it in Egypt, Syria, Hungary, and Finland as well as in Vienna, London, and the mountains of Kentucky. India has made real contributions to our means of treating cataract and glaucoma. Western medicine planted in the Orient has been fruitful. The planting and harvesting must go on. The next International Congress in

Madrid in 1933 will gather much that is new from the countries of Spanish America, as well as from the older fields of Europe and Asia. America did something to secure the benefits of the London Convention and of the Amsterdam Congress. Let it do still more for the congress at Madrid in 1933.

Edward Jackson.

OCULAR MOVEMENTS

The eyes of some fish are on opposite sides of the head; so that the field of vision of one eye is wholly separate from the field of vision of the other. Any object before the nose of the fish may be seen one instant with one eye and the next instant with the other eye, as the body moves the head from side to side. Or the tail of the fish may appear first in the field of vision of the right eye, and then in the left field. Yet the fish has extraocular muscles, recti and obliques, arranged very much as those of man. Evidently there are purposes for which the fish needs to move its eyes, even though these purposes are entirely different from those of the ocular movements of man.

In the process of development, by changes extending through countless generations, the eyes have been moved to the front of the head; so that in the cat family both eyes can see the same object in nearly all parts of each visual field, while in man and the higher monkeys the parts of the field possessing the highest visual acuity can be kept fixed so that they receive images of exactly the same point. In the flounder, which keeps one side turned to the light and the other side buried in the mud, the eyes are shifted from different sides of the head to both on one side. This occurs in the early days of life for each generation. All through the series of animals from fish to man the eye muscles are used to effect the many varying purposes. Evidently the eye muscles do not of themselves control the position or movements of the eyes. Such control rests in the coördinations between visual sensations and ocular movements.

General thinking about eye movements began when Sir Charles Bell had made the distinction between motor and sensory nerves and Stromeyer and Dieffenbach had shown that the habitual positions of the eyes could be changed by shifting the insertions or length of the eye muscles. The eye muscle and its tendon of insertion are concrete things that anyone can see and understand. But the coördinations of the muscle actions cannot be seen and are not easily understood. It was natural that the anatomy of the orbits and of the muscular apparatus should attract the attention of ophthalmic surgeons before the functional coördinations of eye movements had been thought of. But it is certain that coordinations of eye movements and their exact control have existed as long as eye muscles, tendons, and orbits.

The fixing of attention on such coördinations, rather than on "muscle operations", is a distinct advance in the rational treatment of heterophorias and squints. These are disorders of the coordinations that underlie binocular vision—the directing power of binocular movements. What Stutterheim (see page 460) calls "involuntary convergence" is a basic coördination that makes binocular vision possible. He points out that this involuntary convergence was brought about by voluntary convergence, and that therefore the involuntary is the more recent and less fixed coördination. To meet defects in such coördination it is rational to study and apply "kinetic" (or motor) treatment in the rational care of symptoms that arise from this kind of maladjustment.

Edward Jackson.

WASTED EFFORT IN THE CLINICS

Old friends greet us with new faces. The industrial efficiency which in this country has rendered possible the Ford automobile, as well as its more recent successful competitors, is now to be found in the public press and in the minds of the merchants and politicians

of Europe under the new name of rationalization. Rationalization is preparing to ward off a threatened destruction of old England's former leadership in commerce. It is strange that the world should now be watching most eagerly one of the oldest and one of the youngest of modern republics, two powers which in many aspects are widely contrasted, Russia and the United States.

Efficiency, rationalization, system, what you will, if it is not to become stereotyped, a mere orderly way of doing things as the previous generation did them, implies eager thinking, research, the accumulation and study of facts which may tell us how to establish a new wisdom, a new guidance in the kaleidoscopically shifting complex of human life, human work, and human misfortunes.

Medical research of any kind, provided it is not a mere vainglorious self-advertisement, is a part of this pursuit of new truth in the facts of life and of human relations. In no field of medical activity, perhaps, is there a greater disposition to lapse into perfunctory routine than in the conduct of our public clinics. "I saw fifty patients this morning." Yes, but what did they gain, and what did you learn from them? Will they return tomorrow, or next week, as you directed them, or will they drift until some worse condition develops, which timely insistence and investigation might have prevented?

Certainly not the least useful function of an organization like the National Society for the Prevention of Blindness is its friendly survey of the defects and necessities of the public clinics in the matter of "follow-up" work. Interesting facts concerning past and present studies of this kind were contained in the report of the meeting of the Section on Ophthalmology of the College of Physicians of Philadelphia on October 6, 1930 (American Journal of Ophthalmology, 1931, March, page 245). At that meeting Dr. Haven Emerson recalled the records of investigations made in Philadelphia as long ago as 1875, under the leadership of the late Dr. Samuel D. Risley. Unfortunately, "in some of the public schools today Philadelphia was found to be tolerating lighting conditions that were severely condemned by the survey group in 1875." Let it not be thought that Philadelphia is unique in this neglect of good advice, for probably every large city in the country can show similar examples.

At the same meeting Dr. Franklin Royer, of the National Society for the Prevention of Blindness, confessed that a tremendous waste of professional effort was shown in all the out-patient departments which had been investigated. Many patients with such serious eye conditions as interstitial keratitis, phlyctenular keratoconjunctivitis, and uveitis anterior or posterior were shown to have attended scarcely long enough to establish the diagnosis. A committee of ophthalmologists, basing their consideration upon thirteen ocular conditions all of which would require watchful care in the eye clinic and would be likely to cause deterioration of vision if they were neglected, reviewed 738 clinical records. A large proportion of these patients had disappeared from the clinics without the possibility of showing what, if any, results had been secured by treatment, and only four were recorded as having made the desirable number of dispensary visits.

"Forty cases of corneal ulcer (ordinary abrasions not being included), 16 cases of interstitial keratitis, 33 cases of phlyctenular keratoconjunctivitis, 21 cases of iritis, 7 cases of uveitis, 54 cases of disease of the choroid and retina, 6 cases of papillitis, 2 cases of papilledema, 26 cases of optic atrophy, and 12 cases of glaucoma made but a single clinic visit each."

In the class of patients visiting public clinics it is impossible to expect perfect coöperation. But much can be accomplished by the systematic activities of an adequate corps of visiting nurses; and it is clear that no large public clinic can afford to carry on without such assistance. For the benefit of the individual patient, and for the accumulation of experience which can be applied

to the relief of future sufferers, there is probably no wiser expenditure than that which is devoted to follow-up work.

W. H. Crisp.

BOOK NOTICES

Giza Memorial Ophthalmic Laboratory, Cairo, fourth annual report, 1929. 138 pages, 24 illustrations.

This excellent report coming from the director of the Laboratory, Mr. Rowland P. Wilson, and published by the Department of Public Health under the Minister of the Interior, is an expression of the fine scientific work that is being done in ophthalmology in Egypt. The laboratory is admirably equipped, having in addition to the ordinary appliances the new Duke-Elder lamp for phototherapy and the "reflex-free" Nordenson camera. Original investigations on the part of those not officially attached to the Laboratory are encouraged, and opportunities for work upon the problems associated with the early stages of trachoma have been offered by the child welfare center of the health department. A course in ophthalmology is conducted in the spring and autumn for the benefit of the junior medical officers of the ophthalmic section.

Specimens are received at the pathological section from the various government officials and from private ophthalmic surgeons. Among the cases examined were certain rare tumors of the orbit including a lymphangioma, a myeloma and a perivascular endothelioma.

Interesting research was done on trachoma, in which it was considered definitely established for the observers "that monkeys and apes may suffer naturally from a condition of the conjunctiva which we prefer to call 'follicculosis' rather than follicular conjunctivitis or granular conjunctivitis." "In several instances, it has been possible to observe the course of natural folliculosis in monkeys over a period of three years. In none of these cases have cicatrices or pannus developed, but the condition appeared to remain practically stationary." "It has been possible to induce follicles on the conjunctivæ of rabbits and monkeys by mere irritation and trauma alone, due attention being paid to asepsis."

The monkeys used in the experimental work were cercopithecus æthiops and the macacus rhesus. The natural and experimental condition was interpreted as not trachoma but a simple folliculosis. "There are, however, occasions on which it is exceedingly difficult to come to a correct diagnosis. It is quite possible that the clinical appearances and course of human trachoma are not the same when the disease is transferred to the conjunctiva of monkeys. As, therefore, no definite criterion exists as to what constitutes trachoma in animals, the results of such experiments must always remain unsatisfactory, and therefore the final proof of the etiological relationship of any organism to trachoma must rest in the behavior of the human conjunctiva when infected with the organism in question."

The subject of blindness in Egypt is of world wide interest. In 1915 the percentage of those blind in one or both eyes was 15.6 percent. The government hospitals show the percentages of blindness in 1928 to be in one eye 7.2 percent, in both 2.1 percent or total 9.3 percent. In 1,310 of the inhabitants of Bahtim examined the total number blind in one or both eyes was 6.64 percent, which is considered as a representative figure for the whole country. Of the causes of blindness acute purulent and mucopurulent conjunctivitis constitute 76.4 percent, primary glaucoma 10 percent and trachoma 6.6 percent. Almost all of the trachoma cases could count fingers. It is, therefore, exceedingly rare for trachoma to cause absolute blindness.

A study of the differential leucocyte count in relation to diseases of the eye, by Farid Massoud, is included in the report. The percentage of large mononuclears is increased in uveal disease. The stimulus that produces these cells is most probably in the nature of some

toxin carried by the blood circulation and acting on the reticulo-endothelial tissue; and it may arise from a non-perforating injury. Just as a polymorphonuclear increase is indicative of a septic focus, so a high mononuclear increase would appear to indicate that a toxin is present which is particularly dangerous to the eye.

The report contains sixteen excellent plates, the first of which is of the beautiful ophthalmic hospital at Giza. The report is a model of its kind and it would be well if the vast wealth of clinical material passing through our own institutions were as effectively used.

Park Lewis.

Bericht der Deutschen Ophthalmologischen Gesellschaft, 1930. Edited by the Secretary, A. Wagenmann. Paper, octavo, 432 pages, 206 illustrations, 38 tables in the text. Munich, J. F. Bergmann, 1930.

This report of the forty-eighth meeting of the Heidelberg Congress, held June 12, 13, and 14, maintains the interest and scientific importance of this series of meetings, which started as a gathering of friends of Albrecht Graefe. This meeting was held under the presidency of Theodore Axenfeld, who died July 29, 1930. In attendance were 204 of its members, German ophthalmologists, with 39 guests, while 76 of the eminent German ophthalmologists presented or discussed papers here published.

The volume sustains the reputation of its predecessors for presentation of scientific facts and therapeutic devices, and illustrates the interest of German ophthalmologists in detail and in philosophic or theoretic discussions. It also indicates the fondness which those who contribute to it have for mechanical elaboration and highly developed machinery. The disposition to make apparatus minutely accurate, but unduly complex, often limits its application to practical service. This tendency has been observed lately in America and Britain, and is strongly evident in some of the papers on new instruments and procedures in this volume.

While titles like "What is neutral light", "Experimental studies of results of diphtheric infection of the eyes", "The crossing of sensory and motor tracts", "Internal secretions and eye diseases", may seem academic, it should be noted that the present technique for Gonin's operation on detached retina was what brought out the most general discussion, by sixteen speakers; and among the forty-five papers and twenty-five demonstrations included in the program were many devoted to very practical subjects. Evidently, in spite of problems of reparations and in spite of the influence of post-war psychology, Germany has not abdicated her leadership in ophthalmology.

Edward Jackson.

Indications for kinetic treatment of the eyes. N. A. Stutterheim, M.D., Johannesburg, South Africa. Paper, octavo, 82 pages, illustrated with 11 charts. London, George Pulman and Sons, 1930.

This is a thesis approved for the degree of doctor of medicine in the University of Witwatersrand, South Africa; and is one of a series of monographs published in the same general form as the British Journal of Ophthalmology. The headings are: introduction, methods of investigation, experiments and results, discussions, conclusions, summary, references, and integral survey of results of 100 cases of kinetic treatment for asthenovergence. This is a good piece of literary work, discussing defective ocular movements partly from a new point of view.

The introduction contains a summary of the literature, bringing together expressions from Donders, Duane, Sherrington, Parsons, Worth, Kappers and others, that justify the young writer in considering the subject of defective oculomotor coordinations from his particular point of view. Then follows an emphasis on "involuntary convergence" and "stimulotrope movement". Of the latter the author says: "Convergence,

as a visual act, is physically an active inward rotation of the eyeballs; optically it is direction of the visual axes on the object; physiologically, it consists in what could be called stimulotrope movement of the fovea of either eye to the spot where the retina is stimulated by those rays which evoke either conscious or unconscious predilection."

The author's point of view is largely based on our recent knowledge of the evolution of human vision, its coordinations and exact binocular view. Although most writers on the ocular movements have regarded ocular convergence as voluntary, many passages are quoted as implying that the movements are often beyond direct control of the will, particularly movements that give binocular fusion, necessary to the highest form of vision yet involved. Stutterheim holds that such involuntary convergence is necessary to full and comfortable use of the eyes for many of the occupations of those living under conditions of modern civilization.

It is also held that convergence was at first brought about by voluntary effort; and that involuntary convergence, such as may be thought of as reflex convergence, being a more recently acquired convergence, is more likely to be imperfect and to cause strain than is voluntary conscious convergence. The imperfections of involuntary convergence the author groups as asthenovergence. They have been chiefly discussed before as heterophorias and have been ascribed to the anatomy of the ocular muscles and their attachments. To think of them as instances of incomplete evolution of the neuromotor apparatus, and so to endeavor to remedy them by training exercises, is more rational and more practical.

For the diagnosis and treatment Stutterheim uses batteries of prisms placed in a simple apparatus that does not prevent the surgeon from watching the behavior of the eyes as the prism effect is increased. The results of his "kinetic" (motor) treatment are shown by tabulated reports of his one hundred cases. The different columns of the table give age and form of defect, history, vision, correcting glasses, balance and vergence, and the result of treatment. The charts explain the shifting of the eyes in certain mammals forward to the position of parallelism; the changes in direct and crossing fibers of the optic nerves, chiasm, and tracts; and relative accommodation and convergence. Also included are diagrams of involuntary convergence as increased under kinetic treatment. The monograph is one of the most valuable that has appeared for many years relating to the motor anomalies of the eyes.

Edward Jackson.

ERRATUM

The last sentence of the discussion by Dr. William C. Finnoff recorded on page 155 of the February issue should read: "He also said that cases of folliculosis would not develop pannus."

ABSTRACT DEPARTMENT

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history

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8. GLAUCOMA AND OCULAR TENSION

Larsson, S. **Is the intraocular tension of the uninjured eye affected in ocular injuries?** Acta Ophth., 1930, v. 8, p. 261. (See Section 16, Injuries.)

Rauh, Walter. **Treatment of glaucoma with glaucosan.** Zeit. f. Augenh., 1930, Dec., v. 73, p. 8.

With glaucosan one is able to postpone operative treatment for weeks or months. In those cases of glaucoma simplex in which the tension could be kept normal at the clinic with miotics, glaucosan allowed the patient to resume his work for a time longer. There is a danger that it may be harder to persuade the patient to consent to operation when this becomes necessary.

F. H. Haessler.

Simko, S. **Causes for failure of treatment of primary glaucoma.** Ofthalmologicky Sbornik, 1930, v. 5, pp. 105-107.

The author bases his opinion on 437 cases, covering a period of ten years. Reasons for failure of treatment in primary glaucoma are: (1) The patient comes too late to the ophthalmologist, either because he is careless or because the general practitioner has made a false diagnosis (24.4 percent absolute glaucoma). (2) Unsatisfactory postoperative control. (3) Neglect of medical instruction. (4) Bad mode of living. (5) Too early discharge from hospital. (6) Refusal of operation. (7) Postoperative complications.

G. D. Theobald.

Slavik, B. **Concerning congenital and juvenile glaucoma.** Ofthalmologicky Sbornik, 1930, v. 5, pp. 62-70.

Thirteen cases of infantile hydrophthalmos (four days to fifteen years) and five cases of juvenile glaucoma (seventeen to thirty-six years) are described in detail and congenital defects are considered. Physical findings, diagnosis, and operative treatment are discussed. Therapeutic results vary according to the age of the condition. The author finds considerable fluctuations of intraocular tension in children during crying and in forcible inspiration and expiration. *G. D. Theobald.*

Slavik, B. **Results with cyclodialysis.** Ofthalmologicky Sbornik, 1930, v. 5, pp. 95-98.

The author's experience with 127 cyclodialyses on 97 patients during an eight-year period is as follows: Cyclodialysis gave the best results in (a) glaucoma simplex; (b) secondary glaucoma, especially that following cataract extraction; (c) absolute glaucoma which followed glaucoma simplex. In inflammatory glaucoma, cyclodialysis is the procedure of choice when iridectomy fails. In hydrophthalmos, results were disappointing. *G. D. Theobald.*

Stastnik, Emanuel. **Zirm's anterior sclerotomy.** Ofthalmologicky Sbornik, 1930, v. 5, pp. 108-111.

Zirm's operation was performed in 104 cases of glaucoma. With the exception of four cases of simple glaucoma, in which this mode of operation was a failure, the results were satisfactory. In seven cases, owing to intraocular tumors and hemorrhagic glaucoma, enucleation was subsequently performed. Zirm's operation consists of a number of subconjunctival cuts made parallel and adjacent to the corneoscleral junction, partially through the sclera. If one deep cut is used it should be about 15 mm. long. When several small cuts are again made, a tiny opening is made in the center of the longest cut. Aqueous slowly escapes, and the iris balloons out. The incision is slightly enlarged on either side, and a broad iridectomy is performed. The best end results were obtained where fistulas were not demonstrable. It is the opinion of various authors that the curative power of iridectomy lies in interruption of the circular nervous plexus and relaxation of the blood vessel vasomotor nerves, with consequent better circulatory conditions. This is an operation of choice where the anterior chamber is very shallow, for in its performance the lens and Descemet's membrane are not injured, and it may be done at any stage of glaucoma.

G. D. Theobald.

Wilder, W. H. **Secondary glaucoma with detached retina in both eyes.** Arch. of Ophth., 1931, v. 5, Jan., pp. 55-65.

This paper reports in considerable detail a case of glaucoma secondary to choroiditis and detachment of the retina. The patient was a man of forty-two years. Glaucoma was first noticed in the right eye, where choroiditis and detachment of the retina were also seen. Operation was followed by considerable hemorrhage into the anterior chamber and somewhat into the vitreous. The left eye was later operated on with very little hemorrhage. Calcium lactate was administered for several days before operation, despite a normal reaction time. The diagnosis of secondary glaucoma was made as the result of finding pigment dust in the anterior chamber and choroidal lesions in the extreme periphery. The origin appears biochemical or inflammatory. Possibly other cases of noncongestive glaucoma may result from low grade uveitis. This case also suggests that the inflow, the mechanism of formation, and the nature of the intraocular fluids, as well as the conditions of exit of these fluids from the eye, play an important part in ocular hypertension. The depths of the anterior chambers in this patient further substantiate such a contention. The picture here seen appears to lend support to the theory advocated by Duke-Elder, Hamburger, and others that the intraocular fluids are produced by a process of dialysis from the capillaries, chiefly of the ciliary regions. The permeability of the capillaries may be increased by the inflammatory process. The detachments and tears in the retina probably resulted from the large amount of fluid from the choroid that failed to diffuse through the retina. *M. H. Post.*

Zuckermann-Zich, M. **Contribution to experimental glaucoma.** Ofthalmologicky Sbornik, 1930, v. 5, pp. 57-61.

Considering glaucoma as an edema resulting from disturbance of the endothelium of the vessels, the author proves her point by injecting a five per cent trypaflavin solution into the anterior chamber and into the conjunctival sac of rabbits' eyes. An edema of the cornea, iris, and ciliary body follows, which results in an increased tension up to 50 to 60 mm. Hg Schiøtz. Microscopic examination shows the arterioles of the iris and ciliary body to be contracted, and an edema of the endothelial cells results in complete ischemia. The veins are greatly dilated and full of blood. Marked edema in the surrounding tissue. The author bases her explanation of the cause of edema on Volhard's theory.

G. D. Theobald.

9. CRYSTALLINE LENS

Castresana, B. **My model of forceps for intracapsular extraction.** Arch. de Oft. His.-Amer., 1930, v. 30, Sept., p. 481.

The new forceps, manufactured by the Fabrica Nacional de Armas de Toledo, is illustrated and described as follows. Eight millimeters of length from the center of curvature to the extremity permit it to reach beyond the center of the lens. The point is rounded to prevent its scratching the posterior corneal surface. The branches back of the jaws are separated from each other to prevent their picking up the iris. Seen from the front the closed jaws have the shape of a hollowed out canoe, and from the back that of a vessel's keel. The grasping surfaces of the jaws are 2 mm. wide and are fenestrated. The form of the forceps permits a firm grasp of a large bite of capsule. *M. Davidson.*

Mills, Lloyd. **Intracapsular cataract operations.** California West. Med., 1930, v. 32, June, p. 405.

The author reviews the indications and contraindications for intracapsular extraction. The Smith expression operation is condemned because, when vitreous is lost, it is often lost in serious amounts, and because of deformity of the whole anterior segment, with much resulting astigmatism. The occasional brilliant results never justify the high incidence of these complications. The capsule traction method of Knapp is successful in about fifty to sixty percent of selected cases upon which it is tried, and has a small percentage of vitreous loss, depending upon the operator's judgment in the selection of cases for this procedure upon his experience: upon the completeness of the anesthesia, and upon the use of sutures. As to the vacuum method of Barraquer, he points out that the dexterity and skill required preclude general acceptance of this method. The author's method of choice is capsule traction as done by Knapp, plus full suturing of the conjunctival flap. *M. E. Marcove.*

Peretz, H. **A short study of the complications of cataract extraction in Egypt, with some practical suggestions.** Brit. Jour. Ophth., 1931, v. 15, Jan., p. 28.

Cataract in Egypt is probably as frequent as in any other region, but is complicated by many other diseases of the eye. Thirty percent of patients over forty-five years of age have only one eye. Furthermore, many patients present obscuring defects such as dense leucoma. Fully ninety percent of the cases present surgical difficulties due to complications.

Trachoma and its sequelæ are of frequent occurrence, and conjunctival infections, lacrimal complications, glaucoma, retinal detachment, arteriosclerosis, myopia, and corneal infiltrations are frequently encountered. Tarsectomy cases present especially difficult situations. Forty percent of aged patients are glaucomatous, and for this reason it is unwise to permit a case of incipient cataract to remain for too long a period without being examined. The discomforts of summer make winter the most desirable time to operate.

D. F. Harbridge.

Sander, P. **Colored crystals on the anterior surfaces of the lenses affected by senile cataract.** Brit. Jour. Ophth., 1931, v. 15, Jan., p. 26.

A female aged sixty-two years, with commencing senile nuclear cataract, presented also a great number of small colored crystals scattered over the anterior surface of each lens. They were cherry-red, light red, yellow, sky-blue, blue-green, and pure green. Movement of the eyes caused a vivid play of light and colors. Five months later the phenomenon had disappeared except a few blue-green amorphous grains. The instability and the location on the anterior capsule were the outstanding features. *D. F. Harbridge.*

Shoji, Y. **Concerning cystein of the lens and its relation to ultraviolet rays.** Arch. d'Opht., 1931, v. 48, Jan., p. 28.

Cystein is found in the lens in free and combined forms. In cataract the

lens first loses the free cystein and then the combined form. In a quartz testtube one can demonstrate experimentally that cystein is changed into cystine by the action of ultraviolet rays. The action of visible and infrared rays is negligible. *M. F. Weymann.*

Varshavski, J. K. **On the Stanculeanu-Török method of intracapsular cataract extraction.** Russkii Opht. Jour., 1930, Nov.-Dec., v. 12, n. 5-6, pp. 494-502.

The author used the Stanculeanu-Török method of intracapsular extraction in eighty-one cases. In thirty-three cases the capsule was broken during the extraction. The vitreous was lost in 5.6 percent, the same complication having occurred in 4.3 percent of extracapsular cataract extractions. The incidence of iris prolapse was not higher than in the use of the classical method (about 4 percent). The visual results were strikingly low: in thirty-one of the forty-four successful intracapsular extractions the visual acuity was below 0.3. This is attributed to disturbances of the vitreous.

The Stanculeanu-Török method is contraindicated in intumescent senile cataracts in which the capsule is too tight and cannot be caught properly with the forceps. *M. Beigelman.*

10. RETINA AND VITREOUS

Chaffee, E. L., and Sutcliffe, Evelyn. **The differences in electrical response of the retina of the frog and horned toad according to the position of the electrodes.** Amer. Jour. Physiology, 1930, v. 95, Oct., p. 250.

The work reported in this paper is a continuation of the study of the electrical responses of the retina begun in 1920, references to which are given.
Ralph W. Danielson.

Deutschmann, R. **On ignipuncture in retinal detachment.** Zeit. f. Augenh., 1931, v. 73, Jan., p. 127.

The author has reviewed his statistics on 539 eyes operated by him in the course of years. His results were, he says, at least as good as those which now result from the enthusiastically acclaimed and sometimes indiscriminately applied Gonin operation. He believes that the essential factor in ignipuncture is a relaxation of tension of the retina, which is brought about by retraction from the point of puncture and fixation of the relaxed retina to the choroid. Deutschmann quotes from his earlier published work to establish his priority for many of the thoughts associated with ignipuncture. He does not believe that Vogt is right in assuming that the retinal tear is the primary cause. Often the hole is closed spontaneously or by ignipuncture without healing the detachment. The tear is possibly a mechanism that protects the retina from tension. In any case the pathogenesis and treatment of retinal detachment should not be considered as a satisfactorily solved problem.

The main question at present is whether one should operate upon all cases immediately. In considering this one must not forget the many dangers of ignipuncture, or that many of the cases in which ignipuncture was very successful were old cases or cases in which no hole could be found.
F. H. Haessler.

Gipner, J. F. **The clinical significance of retinal arterial changes and retinitis in cardiovascular renal disease.** New York State Jour. Med., 1930, v. 30, Aug. 15, p. 961.

This is a long discussion of the differential diagnosis as to whether retinal sclerosis is senile, primary, secondary, or hypertensive in character. (Thirteen drawings, one chart, and a bibliography). *Ralph W. Danielson.*

Granit, Ragnar. **Comparative studies on the peripheral and central retina. 1. On interaction between distant areas in the human eye.** Amer. Jour. Physiology, 1930, July 1, p. 41.

This is a highly technical paper on the subject indicated in the title. Gratin concludes that interaction is present and is more pronounced in the periphery. *Ralph W. Danielson.*

Greear, J. N., Jr. **Infantile amaurotic family idiocy, with report of a case in a child of non-Jewish parentage.** Southern Med. Jour., 1930, v. 23, April, p. 324.

The author gives a history of this disease. The literature reveals nine other such cases occurring in non-Jewish parents, but none of these are accompanied by reports of post-mortem examination. In the case cited, an autopsy was performed six hours after death, the brain, spinal cord, and eyes being examined. The brain and spinal cord showed ballooning of the ganglion cells, with faint granularity of the cytoplasm and lateral displacement of the nuclei. The eyes showed complete absence of the nerve fiber layer of the retina. The ganglion cells were normal in size, but the protoplasm stained only faintly and the nuclei were displaced to one side. The optic disc was atrophic. (Discussion.) *M. E. Marcove.*

Hansen, R. **Pathological anatomy of disciform degeneration of the central region of the retina.** Zeit. f. Augenh., 1930, v. 72, Nov., p. 360.

The author's histological observations on a case of disciform degeneration of the fovea lead him to the conclusion that the changes are caused essentially by disturbances of circulation and local metabolism in the choriocapillaris, with consequent reactive accumulation of lymphocytes. If the anemia persists the lamina vitrea, the pigment epithelium, and the outer retinal layers become involved.

F. H. Haessler.

Hippel, E. **Anatomical findings in spontaneous healing of retinal detachment with the formation of pigment streaks.** Graefe's Arch., 1930, v. 124, p. 325.

An amaurotic eye with glaucoma secondary to plastic iritis was sectioned equatorially after enucleation and its posterior half examined with the corneal microscope by the light from a Hammer lamp. This examination revealed the well known formation of streaks and peripheral pigmentation characteristic of reattachment of a previously detached retina. Microscopically, a previous retinal detachment was indicated by complete disappearance of the outer layers of the retina, with relatively good preservation of at least some areas of the inner layers. The white partly pigmented streaks showed anatomically a homogeneous substance similar to connective tissue or to drusen, containing no cells nor vessels. The pigment epithelium did not exist as a coherent layer in its normal position. This homogeneous substance occurred beneath or in the retina and was frequently permeated with lines of pigment. Open spaces containing loosened pigmented epithelial cells and coagulated fluid occurred beneath the retina; pigment epithelium lined these cavities on the inner side as well as on the outer. These spaces were probably the remains of previously existing detachments of the retina. It could not be determined whether the present changes were due to inflammation occurring before the detachment or to inflammation after the detachment; the present findings do not exclude the assumption of an exudative choroiditis.

H. D. Lamb.

Kalt, M. E. **Exudative retinitis without vascular changes.** Ann. d'Ocul., 1930, v. 167, Nov., pp. 919-934.

The paper is occasioned by the finding of an exudative retinitis in an old man's eye which was enucleated because of chronic iritis. No albumin was found in the urine. Sections showed no vascular change. The histological picture is described at length and microphotographs are given. The conclusion is drawn that the exudate is not due to the vascular change and the suggestion is made that it is due to a toxin which may have origin in the brain and thence extend along the sheaths of the optic nerve to the retina.

Lawrence T. Post.

Larsson, S. **Treatment of retinal detachment with electroendothermy and trephining.** (Preliminary communication.) Acta Ophth., 1930, v. 8, p. 192.

The surgical procedure proposed by the author consists in exposure of the sclera over the detached area through a conjunctival incision, and if necessary tenotomy of one or more ocular muscles; checking hemorrhage by electrocoagulation; application of surgical diathermy over the exposed sclera; and one or two trephine openings with an Elliot trephine; the last procedure providing an outlet for the subretinal fluid and preventing a marked rise in intraocular tension from the postoperative reaction. In seven cases in which the author tried this technique the results were very satisfactory. It does not require the tedious and difficult localization of the retinal holes, necessary in the Gonin operation. It acts, probably, by setting up an adhesive choroiditis and by diminishing the secretion of the choriocapillaris through subsequent atrophy of the healed choroid.

Ray K. Daily.

Lisser, H. **Adiposogenital dystrophia, with atypical retinitis pigmentosa, mental deficiency, and polydactylism.** (Lawrence - Moon - Biedl syndrome). Endocrinology, 1929, v. 13, Nov.-Dec., p. 533.

The author reviews the literature of this rare syndrome, which consists of retinitis pigmentosa, adiposity, genital dystrophy, polydactylism, and mental deficiency. The case reported is that of an eight-year-old girl whose vision had been poor since she was a year old. Examination showed the fundus of each eye to be covered with numerous small grayish dots, not surrounded by pigment, and with an occasional elongated spider-shaped thread of pigment in the periphery; a combination of atypical retinitis pigmentosa and retinitis punctata albescens. *M. E. Marcove.*

Muggia, A., and Vita, A. **Infantile amaurotic family idiocy.** Minerva Medica, 1930, July, p. 5.

The authors describe a typical case of amaurotic idiocy (Tay-Sachs disease) in a child of fifteen months, daughter of Piedmontese Jews. They call attention to the rarity of the affection in Italy, and pass in review the writings of various authors on this and related diseases.

Müller, Hans. **Retinal detachment after general bodily injury.** Zeit. f. Augenh., 1931, v. 73, Jan., p. 163.

A twenty-nine-year-old carpenter fell from a height of seven feet and struck his head on a concrete foundation. Skull fracture resulted. On the tenth day a retinal detachment was found, with a long tear in the extreme periphery. The retinal tear with secondary detachment was most probably the result of sudden traction on the retina caused by the fall on the head.

F. H. Haessler.

Ormond, A. W. **Spontaneous detachment of the retina.** Brit. Med. Jour., 1930, May 24, v. 1, p. 940.

Ormond, after personal explanation from Gonin, gives a detailed account of Gonin's theory regarding spontaneous detachment of the retina. A complete description of Gonin's technique is also given. *Ralph W. Danielson.*

Pines, N. **Retinitis nephritica or albuminurica.** Brit. Jour. Ophth., 1931, v. 15, Feb., p. 75.

This is a continuation of the author's previously published clinical investigations of retinal vessel changes. The present contribution is concerned with retinal changes associated with kidney lesions. The work of other investigators is discussed together with the author's observations.

It is a clinical fact that the urine most saturated with albumin is met with in "nephrosis," where the blood pressure is normal and retinal changes do not appear. On the other hand retinitis is seen in patients with nephritis associated with raised blood pressure and scanty or even absent proteinuria. A study of a preceding hypertension will decide the important pathological question as to the cause of retinitis.

It is the author's belief that the retina suffers pari passu along with the vessels, the same toxin attacking both of them, which makes a preexistent

renal lesion in the history unnecessary. Fully developed retinitis albuminurica has been observed although all renal tests were normal. In the toxemia of pregnancy the retinitis is preceded by hypertension.

There are three possible explanations why the retina is the first involved of the sense-organs. (1) The kidney has an endocrine secretion, which is intimately associated with the vascular system and with the brain, and especially with the retina. (2) The difficulty of the capillary exchange of blood and lymph in the retina due to impaired metabolism of the cells themselves. This means that albuminuric retinitis expresses an actual perverted metabolism of the retinal cells, most probably going on also in other parts of the brain and even in the body generally, but apparently aggravated out of all proportion by the peculiar anatomical structure of the retinal vessels. (3) It may be that there is a special pathological factor, or a combination of several pathological factors, which gives rise to nephritis and retinitis alike. *D. F. Harbridge.*

Wagener, H. P. **Retinal vascular changes in hypertension.** Annals Internal Med., 1930, v. 4, Sept., p. 222.

Wagener says that, in his opinion, all of the branches of the central artery usually studied with the ophthalmoscope are arterioles. Visible sclerosis of these vessels, not secondary to primary disease of the optic nerve, of the retina, or of the choroid, is practically always evidence of general hypertensive disease, whether or not the blood pressure reading is high at the time of examination.

Advancing sclerosis of the retinal arteries, in his opinion, always implies potentially dangerous hypertension, whether or not the sclerosis is complicated by episodes of retinitis. Wagener believes further that types of hypertension other than essential show retinal arteriosclerosis rarely. Hence, in a case of hypertension, the presence of such sclerosis of the retinal arterioles, even if associated with retinitis, means that this hypertension is the result, or is a symptom, of a diffuse vascular lesion and is not secondary to primary glomerulonephritis.

Exclusive of the various forms of retinitis observed in glomerulonephritis, retinitis which occurs in hypertension may be divided satisfactorily into that dependent on local vascular disease and that originating in, or at least associated with, vasoconstriction, the angiospastic retinitis of Volhard. To the first group belong isolated hemorrhages in the retina, thrombosis of individual retinal veins with resultant hemorrhage, edema and exudation into the retina, and the retinitis of arteriosclerosis. Essentially, these are all strictly localized lesions, and their diagnostic and prognostic significance does not differ greatly from that of the associated and usually causative arteriosclerosis. The retinitis of arteriosclerosis is observed only in the presence of rather severe general arteriosclerosis, and such patients seem to be especially subject to cerebral vascular accidents.

These localized types of retinitis should be carefully distinguished from those more generalized or diffuse types of involvement of the retina dependent on arterial constriction. It is possible to distinguish two distinct forms of this retinitis: one is associated with relatively benign hypertension, and the other with the malignant hypertension of Keith, Wagener, and Kernohan. Wagener gives the characteristics of each form.

The significance of individual vascular changes in the retinal picture is discussed. Probably arterial constriction or spasm is the most dangerous element of hypertensive disease, may be the primary factor that results in arteriosclerosis, and is largely responsible, if not for the hypertension itself, at least for the retinal, cerebral, and renal complications. Efforts should be directed especially to discovery of the cause, and to the relief, of this tendency to arterial or rather arteriolar constriction. (Bibliography) *Ralph W. Danielson.*

Wilder, W. H. **Secondary glaucoma with detached retina in both eyes.** Arch. of Ophth., 1931, v. 5, Jan., pp., 55-65. (See Section 8, Glaucoma and ocular tension.)

11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Fischer, Elizabeth. **Anatomic contribution to the genesis of choked disc.** Zeit. f. Augenh., 1930, v. 72, Nov., p. 368.

An anatomical study is presented of a pair of eyes in one of which there was typical papilledema, and in the other optic atrophy without any sign of edema. This finding supports Behr's contention that papilledema results from accumulation of the fluid that normally is transported from the interior of the eye through channels associated with the nerve fibers.

F. H. Haessler.

Rumjanzewa, A. F. **Papilledema and intraocular tension.** Zeit. f. Augenh., 1930, v. 72, Nov., p. 391.

Modern theories postulate interference with the exit of intraocular fluid through the optic nerve. It seems obvious that the intraocular tension should be changed in papilledema. Since the author could find no report of such findings she undertook to investigate the matter herself. In twenty-four patients with papilledema the intraocular tension was decreased, and it rose after lumbar puncture or cranial operation. *F. H. Haessler.*

Wilmer, W. H. **Chronic retrobulbar neuritis.** Jour. Tennessee State Med. Assoc., 1930, v. 23, Sept., p. 313.

Wilmer begins his article by giving reports of eight bilateral cases in which there was chiefly or solely involvement of the papillomacular fibers, in contradistinction to a general neuritis or a perineuritis.

Some of the etiological factors are discussed. The author calls attention to the close parallelism between alleged causes of disseminated sclerosis and of retrobulbar neuritis. Of the 5,058 patients admitted to the Wilmer Ophthalmological Institute for survey, thirty suffered from retrobulbar neuritis. Of these, eighteen cases have been followed for some time and the probable causes were as follows: multiple sclerosis probable, 11 percent; sinus disease probable, 11 percent; gall bladder probable, 6 percent; diabetes probable, six percent; Leber's disease, 16 percent; tuberculosis possible, 6 percent; multiple foci (teeth, tonsils, and sinuses), 14 percent. Fifty percent of these patients were sensitive to tuberculin.

Among other conclusions Wilmer states that a positive spinal fluid curve with a negative Wassermann reaction is highly suggestive of disseminated sclerosis. Treatment is discussed with special regard to removal of any manifest focal or general infection or diathesis. (Bibliography.)

Ralph W. Danielson.

13. EYEBALL AND ORBIT

Ellett, E. C., and Rychener, R. O. **Glass ball implantation following enucleation.** Jour. Indiana State Med. Assoc., 1930, v. 23, June, p. 251.

Ellett and Rychener first give a brief résumé of the development of enucleation and implantation. In outlining their technique they emphasize the advantage of separating the globe from the surrounding tissues by putting in the closed scissors and opening them. A purse string of 00 chromic catgut or irondyed silk, no. 1 to no. 3, is used in the deep tissues (capsule and muscles), while the conjunctiva is closed with a horizontally running suture of silk. Special suturing of the muscles is not done. A pressure bandage is used for seventy-two hours and the patient is kept in bed for twenty-four hours. The authors believe that the pressure bandage is a very important factor in securing retention of the ball. The prothesis is as a rule inserted at the end of two weeks.

Implants of glass have been chosen because they are less expensive, lighter, and easily sterilized. Balls sixteen to

eighteen mm. or less in smaller individuals are employed.

Since 1919 the authors have done seventy-eight implantations in the manner described. The ball has been expelled in seven cases, all within two weeks of the operation. These seven cases are outlined in detail. One ball was retained by suturing even after becoming exposed. In one case a late implantation was done with a very successful result. (Eight figures, and discussion.) *Ralph W. Danielson.*

Heath, Parker. **Xanthomatosis or lipoid histiocytosis.** Arch. of Ophth., 1931, v. 5, Jan., pp. 29-54.

Two cases of diffuse liporeticular disease, also known as Christian's syndrome, are reported. One case came to autopsy, the other recovered as the result of feeding powdered thyroid and the administration hypodermically of obstetric pituitary solution. The two cases are described in considerable detail. From the ophthalmological standpoint, the exophthalmos is the feature of the disease of especial interest. The loss of bone at the apex of the orbit permits the muscular ring attachments to relax and move forward. The xanthoma masses usually found in the orbit further accentuate this tendency by pressing forward the globe. In the second case there was marked subsidence of the exophthalmos as bony regeneration and absorption of the xanthomas took place.

In the second part of the paper, the author suggests that our increasing knowledge of the underlying factors producing a large variety of clinical and pathological conditions should enable us to greatly simplify our classifications, combining many supposedly different diseases under one entity.

M. H. Post.

Lee, T. P. **Determination of the position of the corneal apex in relation to the temporal margin of the orbit.** China Med. Jour., 1930, v. 44, Jan., p. 10.

Four hundred Chinese were examined to determine the average exophthalmometric readings as well as the average intertemporal distance and the length of the palpebral fissure. Only normal eyes were used. Hertel's exophthalmometer was used with the patient in the sitting position with head upright. The average exophthalmometric reading was in the right eye 14.4 mm. and in the left eye 14.5 mm. The average intertemporal reading was 97 mm. The average length of the palpebral fissure was 27.1 mm.

M. E. Marcove.

Markovic, A. **Coloboma at the optic nerve entrance with normal visual acuity.** Zeit. f. Augenh., 1931, v. 73, Jan., p. 152.

The patient described had a typical posterior segment coloboma at the entrance of the optic nerve, associated with normal vision, a slightly enlarged blind spot, and a small peripheral field defect in the right eye. In the left eye the same malformation was associated with microphthalmos, amblyopia, and exotropia. The exotropia was corrected surgically, and a +4.00 sphere over the small eye gave a good cosmetic result.

F. H. Haessler.

Sander, P. **A case of microphthalmos.** Brit. Jour. Ophth., 1931, v. 15, Jan., p. 22.

The author observed a female baby from the age of 23 days up to her ninth year. The eyeballs were 9 mm. in diameter. The transparent corneas were 4 mm. in the horizontal meridian and 2 mm. in the vertical. Through the cornea some bluish-grey material could be seen, but no anterior chamber, pupil, or iris. There was no light perception; sensibility and muscular movements were normal. During the second month of the mother's first pregnancy she witnessed a disastrous operation for glaucoma on her own mother. In due time she gave birth to a baby which had no eyes, and which died from an acute infection. Apprehension haunted the mother during the whole of her second pregnancy, which ended in the birth of the child whose case is here recorded. *D. F. Harbridge.*

Sander, P. **A family affected with keratoconus and anterior polar cataract.** Brit. Jour. Ophth., 1931, v. 15, Jan., p. 23.

A family consisting of the father aged seventy years and three unmarried daughters respectively aged twenty, twenty-six, and thirty years all showed features of physical and intellectual defectiveness. All had long standing neglected trachoma, varying degrees of keratoconus, anterior cataract, and myopia ranging from —5.00 to —20.00D. The reporter considers the condition due to defects of development and nutrition rather than to intrauterine infection. *D. F. Harbridge.*

Schneider, A. S. **Pulsating exophthalmos.** New York State Jour. Med., 1930, v. 30, May 15, p. 569.

After discussing the cause and development of pulsating exophthalmos, Schneider claims that tying the common carotid is the logical and best procedure to control the condition. He urges early operation to prevent loss of vision. Attention is called to the frequent injury to the optic nerve by the same factor that causes the exophthalmos (fracture of the sphenoid bone in seventy percent of the cases).

A case report is given of a thirty-five-year-old male who developed pulsating exophthalmos after going in swimming. He remembered no injury while swimming, but gave an indistinct history of having had a swelling removed from the temporal region on the same side seventeen years previously. Schneider believes the tumor was an aneurism or a cavernous hemangioma, for sufficient bone erosion had been produced to mislead the roentgenologists into diagnosing malignancy at this time. Ligation of the common carotid controlled the pulsation and the restriction of motion of the globe, but the exophthalmos has persisted. *Ralph W. Danielson.*

Wright, R. E. **The use of the snare in enucleation of the eyeball.** Indian Med. Gazette, 1930, v. 65, Oct., p. 550.

In performing enucleation of the eyeball in cases where it is considered advisable to place an implant of some kind inside the muscle cone, it is desirable to have as dry and clean an exposure of Tenon's capsule as possible. Even in simple enucleation where no attempt is made to form a movable stump, it is well to have a minimum of bleeding and thus to eliminate postoperative reaction.

The author originally used a double clamp designed by himself, but now uses an Eves tonsil snare manufactured by Meyrowitz. It is desirable when intending to insert an artificial globe or other implant to pick up the recti either on ligatures or with suitable clamps before they are divided. When the various muscle insertions have been severed and the globe has been cleanly separated from Tenon's capsule back to the zone of the short ciliary vessels, Trelat's enucleation spatula is inserted and keyed on to the pedicle. With gentle backward pushing movements the optic nerve and the various ciliary vessels and nerves are stripped and defined for a short distance from the globe. Then with the Trelat enucleation spatula still in position but pushed gently backward, the snare wire, arranged to a suitably sized loop, is threaded over the globe and gradually tightened as it approaches the posterior aspect of the globe. Close behind the globe and in front of the spatula, the wire is slowly and firmly tightened, held like this for a short time, and then sufficient force is applied to cut through the optic nerve, and ciliary vessels. The author says nothing as to whether he would use the snare in a case (as in suspected retinoblastoma) in which a long optic nerve is desirable.

Ralph W. Danielson.

14. EYELIDS AND LACRIMAL APPARATUS

Barclay, Lyman. **Mikulicz' disease.** Canadian Med. Assoc. Jour., 1930, v. 22, April, p. 498.

The case discussed shows chronic, painless, progressive, bilateral enlargement of the lacrimal, accessory lacrimal, submaxillary, and sublingual and a suggestion of enlargement of the par-

otid glands. Examination of the chest was negative, Wassermann negative. A gland removed for microscopic examination showed very little glandular structure, only a few acini being present. There are lined by a single layer of cuboidal epithelium on a basement membrane. The tissue is moderately vascular and very cellular on account of a diffuse round-cell infiltration. The fibrous tissue which forms the bulk of the structure is arranged in sheets, between which are strands and masses of round cells, accumulations of infiltrating lymphocytes. The author considers this a case of true Mikulicz' disease, but states that it is often difficult to exclude pseudoleukemia and leukemia. In the former, in addition to bilateral enlargement of glands as described above, there is also a general enlargement of the lymph glands throughout the body. In the leukemia, beside the features above mentioned, there is an enlargement of the spleen, a typical blood picture and other clinical features of a true lymphatic leukemia. *M. E. Marcove.*

Castresana, A. **Radiography of the lacrimal sac.** Arch. de Oft. Hisp.-Amer., 1930, v. 30, Aug. p. 417.

After reviewing the literature, the author points out the usefulness of radiography, not only in preoperative study of the lacrimal passages, but in checking up the results of dacryocystorhinostomy. Lipiodol is used, and two plates are taken, a sagittal one with chin and nose on plate and a lateral one perpendicularly to the lacrimal sac.

M. Davidson.

Dupuy-Dutemps, L. **Blepharoplasty by cervical flap with tubular pedicle.** Ann. d'Ocul., 1930, v. 167, Nov., pp. 895-907.

A case of frightful disfigurement of lids, nose, mouth, and adjacent tissues is described and illustrated. Operations consisted in elevation of a bridge of tissue from the neck and, after development of sufficient circulation, transference of this tissue to areas from which the scars were removed.

Lawrence T. Post.

Ehlers, H. **The embryonic development of lacrimal canaliculi in a case of facial fissure.** Acta Ophth., 1930, v. 8, p. 305.

The author reports the case of a child who had bilateral oblique facial fissure, hairlip, and palpebral coloboma. Laterally to the facial fissure were lacrimal puncta, and microscopic examination of excised tissue from the lateral part of the facial fissure demonstrated the presence of a canaliculus. Such cases have led some investigators to believe that the lacrimal canaliculi develop from the epithelium of the palpebral margin—a view which has been abandoned because it has been proved by embryological investigation that the lacrimal canaliculi develop from the primordial nasolacrimal duct. The reported anomaly has to be explained by an abnormality in development such as, perhaps, dislocated germ cells.

Ray K. Daily.

Hollos, Ladislaus. **Resection of the orbicularis muscle in paralytic ectropion.** Zeit. f. Augenh., 1930, Dec., v 73, p. 27.

The author was able to relieve three patients of paralytic ectropion by resecting a fairly large piece of the orbicularis just below its temporal raphe and suturing the free ends together. He strives for overcorrection and finds the result to be permanent. Before resection the muscle is dissected from the skin and the underlying periosteum.

F. H. Haessler.

Ploman, K. G. **Continued investigations on the lacrimal passages.** Acta Ophth., 1930, v. 8, p. 155-171.

This is an illustrated report of roentgenographic studies of seven normal lacrimal sacs, with the object of demonstrating their function. Krehbiel's phenomenon was present in four sacs, absent in two, and could be demonstrated but once in one. Roentgenographically by volumetric filling with lipiodol, four sacs showed dilatation upon forceful widening of the palpebral fissure, and two were negative in this respect: one

showed a volumetric dilatation which could not be demonstrated roentgenographically. The volumetric test demonstrated that, with individual quantitative variations, there was a regular compression and dilatation of the lacrimal sac in winking; that in contraction of the eyelids there was a more pronounced compression of the sac; and that in some cases the lacrimal sac dilated upon forceful opening of the palpebral fissure. The author concludes that in some cases the sac takes an active part in the conveyance of tears by rhythmic contractions and dilatations on closure and opening of the eyes respectively. In other cases it takes only a passive part because the increased pressure in the orbit during the closing phase of the winking act merely affords the wall of the sac the firmness necessary for proper drainage of tears into the nose. If the walls of the sac are not firm at the moment when it receives tears from the canaliculi, the sac will not propel the tears into the nose, and atonicity of the sac and residual tears will result. While the canaliculi represent the most important part of the pumping mechanism, the lacrimal sac fulfills certain mechanical demands necessary for proper function.

Ray K. Daily.

Polack, B. L. **On the pathology and radical surgery of dacryocystitis.** Russkii Opht. Jour., 1930, Nov.-Dec., v. 12, no. 5-6, pp. 567-574.

In chronic dacryocystitis the mucosa of the lacrimal duct can be easily removed by traction, after the sac is properly dissected. The author performed a combined removal of the sac and duct in seventy-five cases. Pathologic study of the material thus obtained revealed changes in the mucosa of the lacrimal duct identical with those in the sac, namely (1) a damaged epithelial covering; (2) infiltration in the mucous and submucous layers; and (3) formation of scar tissue. Because of these pathologic findings the author advocates removal of the lacrimal duct as a routine procedure in extirpation of the tear sac.

M. Beigelman.

Schlesinger, Joseph. **Tin in the treatment of hordeolosis.** Zeit. f. Augenh., 1931, v. 73, Jan., p. 175.

The author gives two tablets of a tin preparation three times daily for three or four days and finds the treatment strikingly successful.

F. H. Haessler.

Waardenburg, P. J. **The explanation of a series of hereditary familial malformations of the eyes through the fixation of normal fetal stages of development.** Graefe's Arch., 1930, v. 124, p. 221.

Father, two sons, and two out of three daughters showed a series of hereditary malformations, namely: ptosis, blepharophimosis, hypoplasia of the caruncle and of the plica semilunaris, probably hypoplasia of the orbit and dystrophy of the tarsus, epicanthus, hyperplasia of the interocular region with lateral dislocation of the inner canthus and of the lacrimal puncta. A number of considerations may be urged against the idea of Van der Hoeve and Halbertsma that most probably a primary lengthening of the lower canaliculus causes the splitting off of an enlarged caruncular anlage, and that the foreign body effect thus occasioned gives rise to a secondary ankyloblepharon. Waardenburg thinks that each anomaly here recorded can be explained on the basis of a hereditary malformation due to arrest of development, or in other words to the fixation of normal fetal stages. In support of this opinion there is the presence in this syndrome of well recognized hereditary anomalies such as ptosis and epicanthus, also cases having a normal distance of the inferior punctum and an abnormal distance of the superior punctum from the nasal canthus, cases in which the caruncle as well as all traces of inflammation were absent, the presence of an epicanthus not explainable by the theory of Van der Hoeve, and cases with all possible forms of the root of the nose, as often flat as elevated, or broad as narrow. In the beginning of the third embryonal month there is a stage at which all the characteristic changes referred to oc-

cur at approximately the same time as normal stages of development.

H. D. Lamb.

15. TUMORS

Charamis, Jean. **A case of unrecognized juxtapapillary sarcoma of the choroid.** Arch. d'Opht., 1930, v. 47, Dec., p. 833.

A woman sixty-seven years of age gave a history of having an attack of glaucoma in both eyes some months before coming under the writer's observation. Examination showed increased tension in the right eye, with no vision. In the left eye the tension was normal, but the vision was reduced to 1/10. The field in the left eye showed nasal recession with excavation of the papilla. Due to lens changes the right fundus could not be seen. During the course of a year an iridectomy and a trephining operation were done on the right eye with no relief of tension. Finally the globe was enucleated because of an acute attack of pain. Upon sectioning the globe a small-cell sarcoma was found occupying over two-thirds of its space. The tumor seemed to arise from the circumpapillary region.

Because of the location of the tumor and the presence of glaucoma in both eyes the growth remained unrecognizable until the globe was removed and sectioned. There is no clinical or anatomical method of determining the malignancy of such a tumor, but the statistics are encouraging.

M. F. Weymann.

Cohn, Isidore. **Tumors of the orbit.** Arch. of Surgery, 1930, v. 20, June, p. 906.

Cohn discusses from many angles the following tumors of the orbit: osteoma of the orbit, epithelioma of the lids and of the bridge of the nose, carcinoma of the lacrimal gland, and melanoma. Case reports of each are given.

Ralph W. Danielson.

Gallemaerts. **Cyst of the cornea.** Ann. d'Ocul., 1930, v. 167, Nov., pp. 893-895.

After enumerating the three types of corneal cyst as epithelial, interstitial, and endothelial, a case of cyst in the region of Bowman's membrane is described and illustrated. (Bibliography.)

Lawrence T. Post.

Hu, C. H. **Neuroepithelioma (glioma) of retina with metastases.** Amer. Jour. Path., 1930, v. 6, Jan., p. 27.

Two cases are given with complete autopsy reports and pathological findings; one, of extensive metastases to the skull, skeletal bones, muscles, lymph nodes, and meninges; the other with extension to the brain, spinal cord, and meninges. The embryonal character of these tumors and their analogy to certain tumors of the central nervous system is stressed.

M. E. Marcove.

Levkoeva, E. F. **Orbital psammoma.** Arch. Oftalmologii (Russian), 1930, v. 7, pt. 6-7, pp. 793-802.

The author reports three cases of orbital psammoma. The clinical course of this tumor is characterized by extreme exophthalmos with displacement of the eyeball and extensive involvement of the nasal accessory sinuses. Histologically a fibrosarcoma with numerous psammomatous bodies was found in all cases. According to Wiegmann, orbital psammomata originate in the dura and only secondarily invade the orbit and accessory sinuses. Levkoeva admits the possibility of two other pathogenetic conceptions: (1) the origin of the tumor from the orbital periosteum; (2) psammomatous degeneration or calcium infiltration of tumor masses located near the orbital wall.

M. Beigelman.

Puscariu, Elena. **Plasmoma of the conjunctiva.** Ann. d'Ocul., 1930, v. 167, Dec., pp. 1017-1026.

Three cases of this disease are described and illustrated. All these cases were associated with trachoma, and the frequent association with this disease is pointed out.

Lawrence T. Post.

Rodenbaugh, F. H. **Treatment of malignant tumors of the eye and orbit by radiation.** Radiology, 1930, v. 14, March, p. 309.

There are essential technical differences in the use of radiotherapy in malignant growths of the eye or orbit as compared with other structures of the body in which these agents are in wide-spread use. The problem of dosage is most important. Radiotherapy in the average case of neoplasm is not conservative and a maximum amount of fibrosis in the surrounding tissues is not harmful, but the reverse is true in lesions of the eye. Here a maximum conservation of normal tissue is essential. The agent of first choice is radium, because of ease of application and accuracy in measuring the dosage. In corneal, scleral, and superficial lesions of the eye the technique in general is as follows: 25 to 55 mg. of unfiltered radium applied from two to ten minutes produces an intense superficial reaction with a minimum depth of effect and with a maximum conservation of normal tissue. In the deeper-seated growths heavily filtered local or general orbital radiation either with the x-ray or radium is used.

M. E. Marcove.

Vancea, P. **A contribution to the study of sarcoma of the choroid.** Arch. d'Opht., 1931, v. 48, Jan., p. 43.

Sarcoma of the choroid occurs most often between forty and sixty years of age and in about five out of every ten thousand patients. To demonstrate the difficulty of early diagnosis a case is reported in which a thirty-year-old man with a history of syphilitic infection complained of poor vision in both eyes for three weeks. Examination showed bilateral optic neuritis with a central scotoma of about fifteen degrees in each eye. After one month a retinal detachment occurred in the macular region of the left eye. Three scleral punctures were done but the detachment continued to progress. Enucleation was advised and refused. After three weeks secondary glaucoma rendered enucleation necessary, and at this time a tumor mass was found in the orbit and brown granules were present on the surface of the enucleated globe. Four months later the tumor recurred in the orbit. This was extirpated. Again there was a recurrence after four months. Complete evisceration of the orbit was then done, but death occurred after six weeks. Examination of the globe showed a moderately pigmented sarcoma of the choroid the cells of which were identical with the orbital tumor. In this case the rapidity of growth of the tumor was striking, as was also its coincidence with bilateral optic neuritis and syphilitic infection.

M. F. Weymann.

16. INJURIES

Berg, F. **Ocular injuries caused by burrs.** Acta Ophth., 1930, v. 8, p. 285.

The author reports a case in which a needle from a burr was imbedded at the superior border of the upper lid tarsus. The patient had photophobia, lacrimation, bulbar hyperemia, and a superficial striation of the cornea. These needles have a tendency to invade the lids, and because they are barbed they offer considerable resistance to removal. The symptoms of irritation may not develop for several days, and without a careful history the diagnosis may be difficult.

Ray K. Daily.

Brøns, J. **Myopia following trauma.** Det oftalmologiske Selskab i Københavns Forhandlinger, 1930, pp. 34-38. In Hospitalstidende, 1930, Dec. 11.

Two cases of myopia following injury, in each case by a blow on the eyeball, are reported. A male twenty-nine years old showed slight injection of the iris and edema of the retina (Berlin's). The vision was reduced to 5/36. After a few days the vision could be made normal only by correction with —2.50 sphere, although the patient had been emmetropic before. The myopia remained unchanged for two months. In the other patient, a boy of fourteen years, a myopia of —3.50 D. appeared within two or three days after the injury and did not change for two months.

Then followed some unusual, severe gymnastic exercises, and his distant vision suddenly became normal without correction; in a few hours after this, a sudden acute glaucoma with tension of 66 mm. (Schiøtz) appeared. The glaucoma disappeared in a few days under appropriate treatment and the myopia failed to return.

The explanation offered for the myopia in these two cases is that relaxation of the zonular fibers took place, probably associated with paralysis of the ciliary muscle, allowing the lens to become rounder and partially dislocated forward. *D. L. Tilderquist.*

Castroviejo, Ramon. **The slit-lamp in the diagnosis of intraocular foreign bodies.** Texas State Jour. of Med., 1930, v. 26, Oct., p. 428.

Castroviejo gives a discussion of the etiology, mechanism, symptoms, lesions, and diagnosis in cases of intraocular foreign bodies. As part of the slit-lamp examination the author calls attention to the use of the diaphragm of Lopez Lacarrère, or the double slit, in order to get two optic sections, a thick one and a thin one. (Six case reports.) *Ralph W. Danielson.*

Jervey, J. W. **Magnetic intraocular foreign bodies: localization and removal with giant magnet.** Southern Med. Jour., 1930, v. 23, March, p. 89.

In cases in which the Sweet localizer cannot be used for localization of foreign bodies in the eye, the author places two small Cushing wire brain clamps on the conjunctiva 3 mm. above and below the cornea in the vertical meridian. This gives two fixed points for localization. Anteroposterior and lateral pictures are then taken to determine the sector and the relative position of the foreign body in the sector. The eye must be kept in the primary position while the x-ray record is being taken, and a true anteroposterior and lateral view must be obtained, otherwise the error will be so great that the method will have little use. (Discussion.) *M. E. Marcove.*

Knepper, W. **Accidental injury to the eyes in childhood.** Zeit. f. Augenh., 1930, Dec., v. 73, p. 1.

In the ten years preceding 1929 one hundred and twelve children with injured eyes were admitted to the eye clinic of the municipal hospital of Essen. The injuries were perforations, contusions, lacerations, ruptures, and burns, caused by stones, airguns, explosives, needles, knives, arrows, sticks, and others toys or tools. More rarely the injuries were caused by a slap on the face, dog bite, or horse kick. There was no characteristic in which the injuries differed from similar accidents to adults. *F. H. Haessler.*

Larsson, S. **Is the intraocular tension of the uninjured eye affected in ocular injuries?** Acta Ophth., 1930, v. 8, p. 261.

Weekers designated the concurrent change in the intraocular tension of the uninjured eye as the consensual ophthalmotonic reaction. In a study of the traumatic variations in tension Leplat found, experimentally, that the tension underwent a short rise, followed by a prolonged fall; this alteration, particularly the fall, sometimes shared by the uninjured eye. The author studied the course of the intraocular tension of both eyes in 150 unilateral ocular injuries of the perforating and nonperforating types. In the majority of cases an effect on the uninjured eye could not be demonstrated, or it was very insignificant. In a large number of cases the tension of the uninjured eye was close to or below the lower normal limit. In a considerable number of cases the tension of the uninjured eye was very low and remained so for a long time. In an eye with sympathetic ophthalmia, a very marked fall in tension preceded by several days the signs which were discoverable with the slit-lamp or the ophthalmoscope. When the injured eye was enucleated and the sympathizing eye recovered, the tension of the latter was normal. Whether a fall in tension has any significance in threatening sympathetic ophthalmia cannot be decided

from this single case. The article contains a detailed tension chart of thirty-one cases. According to the author the low tension in the uninjured eye could not be regarded as a consensual reaction, because it was independent of the tension in the injured eye. It is probably a reflex vasomotor reaction.

Ray K. Daily.

McCullough, C. J. **Importance of visual field studies after head injuries.** Pennsylvania Med. Jour., 1930, v. 33, Aug., p. 733.

McCullough states that disturbances of the visual pathways after head trauma may be due to (1) traumatic cerebral edema, (2) contusion or laceration of tissues, (3) retinal edema, (4) intracerebral, subdural, or extradural hemorrhage, or (5) sequelæ such as brain cyst, brain abscess, or arteriovenous aneurism.

The author concludes that the ophthalmologist should be in daily attendance on all cases of head injury and should make frequent examinations of the visual fields. Ten cases are reported to indicate the degree and frequency of visual-field loss after head injury. Industrial insurance is an important aspect of the problem in five of these cases. *Ralph W. Danielson.*

Rachmann, R. **Injury to the eye by iron splinters in Essen from 1913 to 1930.** Zeit. f. Augenh., 1930, Dec., v. 73, p. 41.

In the past sixteen years the clinic at Essen had admitted eighty-five patients with unquestionable intraocular iron foreign bodies. Seventy-six percent of these were in the posterior segment of the eye. Extraction with the magnet was accomplished in ninety percent of the cases. In four of the remaining eyes the iron was firmly embedded in the sclera and in the other three it had passed out into the orbit. About twelve percent obtained vision better than 20/40. In 37.5 percent the vision was reduced to ability to count fingers or to perceive light.

F. H. Haessler.

Stocker, Friedrich. **Clinical observations of pathology and treatment of hydrogen sulphide inflammation of the eyes.** Med. Klin., 1931, v. 27, Jan., p. 167.

The author reviews the subject as discussed recently by P. A. Jaensch, and gives his clinical experience from the care of the employees of one of the artificial silk factories.

He finds a keratitis involving the lower part of the cornea and the conjunctival sac, which may go on to a severe ulceration of the cornea. He has found little change in the sensitivity of the cornea. He has found that thorough ventilation of the plant is a great factor in reducing the number of cases, and physiological normal saline irrigation with olive oil instillations, or any pure oily substance, relieves the simpler cases, and is the most satisfactory treatment to date. *Beulah Cushman.*

Stoewer, P. **Cataract from minute foreign body.** Zeit. f. Augenh., 1930, v. 72, Nov., p. 382.

The author reports a case of bilateral cataract caused by the presence in the eye of pieces of stone so fine that the patient had not been aware of their entrance. The victim was a miller who chiseled his millstones without wearing goggles. *F. H. Haessler.*

Van der Straeten. **Intraocular lesions and extraocular foreign bodies in the orbit.** Arch. d'Opht., 1931, v. 48, Jan., p. 34.

Intraocular lesions may be produced by an intraorbital foreign body which has not penetrated the eye or which has traversed the eye completely. The demonstration of motility of a foreign body with movements of the eye does not prove that it is intraocular, for certain tissues adjacent to the eye make movements following those of the globe. Employment of the contact shell of Wessely, which is a sort of artificial eye carrying a ring around the cornea which is opaque to the x-rays, is of great value in localizing foreign bodies in the eye and orbit. Three cases of

intraorbital and extraocular foreign body are reported in which the diagnosis was made by radiography and in each of which there were intraocular lesions. *M. F. Weymann.*

17. SYSTEMIC DISEASES AND PARASITES

Carter, L. F. **Trichinosis and its ocular manifestations.** Jour. Amer. Med. Assoc., 1930, v. 95, Nov. 8, p. 1420.

Of the ocular signs and symptoms of trichinosis, by far the most spectacular and characteristic is that of lemon-yellow chemosis of the bulbar conjunctiva overlying the external and internal rectus muscles. This conjunctival reaction is one of the earliest symptoms in fifty percent of the cases. The edema may spread to the lids and to the temporal and frontal regions, and may finally involve the entire face. Painful ocular rotation is frequently a significant symptom. After the first week the edema disappears. Other ocular manifestations are exophthalmos, conjunctival ecchymosis, mydriasis, and retinal hemorrhages.

Two of the author's three cases demonstrated well the symptomatology of trichinosis. The third case of trichinosis was asymptomatic. Eosinophilia was present for a period of from ten to twelve months, with a subnormal neutrophile count. There was no apparent lowering of the patient's resistance during this time. Trichinella larvæ were found in the blood stream in one case as late as the fourth week after onset. The only dependable treatment of apparent value is early purgation. (Graphs, illustrations, discussion.)

George H. Stine.

Goldenburg, M., and Fabricant, N. D. **The eye in the tuberculous patient.** Arch. of Ophth., 1931, v. 5, Jan pp. 66-90.

For this survey 1,073 patients were examined who were inmates of the Municipal Tuberculosis Sanitarium of Chicago. In addition, 105 so-called contact cases, mostly children, were included in the study. Of the former, the examination was limited to the external parts in 159. The remaining 914 were examined with the ophthalmoscope after the use of homatropin. Of the total number of inmates examined, 61 had external lesions of the eye. In only 7 of these was iritis present and in only 3 cases did this appear to be tuberculous in origin. The histories of these seven cases are given. Out of the 914 fundus examinations, 104 were found with various lesions, 78 of which were in the choroid and retina: 19 of these appeared to warrant further study as being of tuberculous origin, and their histories are given in some detail. In 18, the lesion was unilateral. In no case was there involvement of two separate portions of the field. In the contact cases no definitely tuberculous lesions were made out.

In the opinion of the authors, the diagnosis of tuberculosis of the eye rests on the following factors: (1) The presence of a single tubercle after differentiation from a gumma or small neoplasm. (2) Numerous very small tubercles in the presence of miliary tuberculosis. (3) Comparatively normal blood vessels in the presence of marked chorioretinal changes. (4) White, yellowish, or greyish spots surrounded by a fringe of pigment that appears to be fading out. Occasionally, in large spots, similar pigment may be present, scattered over the centers of such spots. (5) Large, diffuse areas, light yellowish-pink or grey in color, with irregular areas of bleaching pigment scattered about them. (6) The tendency toward unilateral distribution, indicating an embolic origin.

Lardaceous deposits on Descemet's are not considered pathognomonic. Neither should too much reliance be placed on the therapeutic use of tuberculin, nor upon the focal reaction, which does not appear to be specific, but may follow the use of nonspecific proteins.

M. H. Post.

Hoffman, W. H. **Gold treatment of eye affections in leprosy.** Jour. Tropical Med. and Hygiene, 1930, v. 33, Aug. 15, p. 233.

Hoffman states that eye affections are so common in untreated lepers that unaffected cases are rarely found. The author believes, however, that if leprosy of the eye is recognized early it can be aborted by gold treatment combined with administration of the chaulmoogra esters. In the treatment of eye cases it is essential that any strong reaction should be avoided, hence treatment is always commenced with quite small doses, gradually increasing with each subsequent injection. The author has used krysolgan and solganol. The opinions of some other writers who have used gold preparations are given. Reference is made to a case of leprous choroiditis reported by the author in the same journal in November, 1929.

Ralph W. Danielson.

Levitsky, M. **Ocular lesions in influenza.** Russkii Opht. Jour., 1930, Nov.-Dec., v. 12, no. 5-6, pp. 453-457.

The special affinity of the influenza virus for the nervous apparatus of the eye is stressed. In five cases lesions of the optic nerve were observed. In four other cases there was definite involvement of the trigeminus, in the form of corneal anesthesia in herpetic lesions of the cornea, and severe trigeminus neuralgia associated with a mild iritis.

These ocular complications occurred in the course of the general affection as well as some months after it.

M. Beigelman.

Pi, H. T. **Syphilitic ocular disease among the Chinese.** China Med. Jour., 1930, v. 42, Feb., p. 118.

Among 23,713 eye cases reviewed, 380 cases or 1.6 percent were found to be due to syphilis. These figures, according to the author, do not represent the actual percentage of syphilitic ocular disease among the Chinese, because insufficient attention was paid to the matter in the years past. Nine cases or 2.3 percent involved the conjunctiva and lids. Chancre, ulcer, and gumma of the lids predominated. One case of gumma of the lacrimal sac region was found. Eighty-three cases or 21.8 percent involved the cornea and sclera, 54 of which were of interstitial keratitis. Although acquired interstitial keratitis is very rare in other countries, here it was found more frequently than the congenital form. The iris and ciliary body were involved in 134 cases or 35.3 percent. This proved to be the most frequent ocular syphilitic lesion, a fact which agrees with reports from other countries. Thirty-four cases of disease of the retina, choroid, and vitreous were found. The optic nerve was affected in 85 cases or 22.4 percent. Primary and secondary optic atrophy were most frequent, the former about twice as numerous as the latter. The ocular muscles were involved in 33 cases or 8.7 percent, the third nerve being the most frequently affected. Only two cases of orbital disease were recorded, the condition in both of these being syphiloma.

M. E. Marcove.

Rosenbaum, J. **Pregnancy as a cause of disturbed vision.** Canadian Med. Assoc. Jour., 1930, v. 22, Jan., p. 64.

The author cites five cases of eye disturbance, occurring during and immediately after pregnancy. The first case was one of bilateral optic atrophy occurring during the fourth pregnancy, with no light perception three years later. The diagnosis of syphilis was made from the placenta. The second case, one of bilateral optic neuritis with central scotoma, occurred two weeks after delivery; there was complete restoration of vision. The third case was one of bilateral optic neuritis with retinal hemorrhages and no light perception. This was preceded by uremia and convulsions. Vision a year later was fingers at one foot. The fourth case was one of incipient cataract one month before delivery, which became complete after confinement. The fifth case was of bilateral chronic glaucoma which developed in the second half of the second pregnancy in a woman twenty-eight years old. The author considers the first three cases to be attributable directly to pregnancy, the fourth and fifth cases as of uncertain relationship.

M. E. Marcove.

Verdaguer, J. **Some observations on ocular acne rosacea.** Arch. de Oft. Hisp.-Amer., 1930, v. 30, Aug., p. 409.

There are palpebral, conjunctival, corneal, and scleral lesions in ocular acne. On the border of the lids there are found erythemato-squamous lesions without nodules. On the conjunctiva there are diffuse telangiectatic lesions characterized by a markedly straight course of the vessels, and nodular manifestations simulating phlyctenules but distinguished from them by absence of tendency to ulceration. In the cornea there are found relapsing ulcers and interstitial vascularized nodes close to the surface and often projecting above it and accompanied by a diffuse vascularization of otherwise unaffected portions of the cornea. When the corneal lesions ulcerate, a rather slow process, they are often confused with Mooren's ulcer, but can be distinguished from it. Episcleral lesions are observed but they never lead to ectasia. All the manifestations of ocular acne are characterized by almost total absence of conjunctival secretion. Women between forty and fifty years are the most usual subjects, and gastric and endocrine disturbances are the principal etiological factors. Rebellious cases demand peridectomy. Case histories are given to illustrate points in diagnosis and therapy. *M. Davidson.*

18. HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Arruga, H. **The relation between ophthalmology and odontology.** Arch. de Oft. Hisp.-Amer., 1930, v. 30, Aug., p. 430.

Eye diseases of dental origin are comparatively rare if we consider the immense number of individuals suffering from dental disease. There are, however, ocular affections traceable to the teeth. We have extension to the eyes of suppurative processes from the teeth across the maxillary sinus and orbit, and certain cases of trophoneurotic keratitis, iritis and reflex neurosis are of undoubted dental etiology. Mostly responsible for ocular complications are caries and related processes of the canines, bicuspids, and premolars. At times a cystic root disease is demonstrable only by x-ray. The dentist should be the authority as to the need for extraction and exploration and the ophthalmologist should refrain from advising indiscriminate sacrifice of useful teeth. *M. Davidson.*

Bednarski, Adam. **Anatomical eye pictures in the manuscripts of Roger Bacon, John Peckham, and Witelo.** Sudhoffs Arch. f. Geschichte der Med., 1931, v. 24, pt. 1, p. 60.

In the thirteenth century three great learned men, philosophers, wrote on the subject of perspective. They were Roger Bacon (1216-1294), John Peckham (about 1240 (?) to 1292), and Witelo (about 1220 to about 1279). These works contained, in addition to complete description of the anatomy of the eye, anatomical pictures. The pictures are very clearly reproduced in the paper by Bednarski, with many quotations from the original Latin. There are also allusions, with illustrations, to the anatomy of the brain and to cerebral functions. Bednarski is satisfied that these anatomical manuscripts and illustrations by Bacon, Peckham, and Witelo were well known and distributed in the late middle ages in Latin Europe. *W. H. Crisp.*

Bednarski, Adam. **The anatomic illustration of the eye by John Peckham, archbishop of Canterbury in the thirteenth century.** Sudhoffs Arch. f. Geschichte der Med., 1929, v. 22, pt. 3, p. 352.

This is a brief account of the description of the eye, with illustrations, given in the manuscript on "perspective" by the learned archbishop of Canterbury. See preceding abstract. *W. H. Crisp.*

Frenkel, Henri. **Concerning the medicolegal value of traumatic syndrome of the anterior segment.** Arch. d'Opht., 1931, v. 48, Jan., p. 5.

Several case reports are cited to demonstrate the value of recognizing the

syndrome produced by injury to the anterior segment in industrial accident cases. The most commonly contested cases are those in which the question arises whether cataract has been produced by a blunt injury. In the syndrome of trauma to the anterior segment one finds a part or all of the following: dilatation of the pupil with complete or incomplete internal ophthalmoplegia, tears in the iris, crenelated pupillary border, iridodialysis, iridodonesis, unequal depth of the anterior chamber, equatorial or subcapsular discrete lens opacities, and subluxation of the lens.

The immediate effect of a contusion is to force the lens backward, after which it rebounds anteriorly from the compressed vitreous, tearing the zonule. Its impact against the iris may cause pigment deposits on the capsule and localized subcapsular opacities which rarely progress to maturity. The visual acuity may also be lowered as a result of macular damage from contrecoup, although the fundus may appear normal. Where cataract has developed from a contusion one will find evidence of the traumatic syndrome, especially in unequal depth of the anterior chamber caused by a partially subluxated lens, and more or less iris damage.

M. F. Weymann.

Gallemaerts. **J.-B. Coppez (1840-1930).** Ann. d'Ocul., 1930, v. 167, Dec., p. 985. See Amer. Jour. Ophth., 1931, v. 14, Feb., p. 167.

International association for the prevention of blindness. Arch. d'Opht. 1930, v. 47, Dec., p. 841.

This report covers the transactions and papers presented at the meeting in Brussels on October 10, 1930. The material does not lend itself to abstraction.

M. F. Weymann.

Kantor, D. W. **The national aspect of typesetter's myopia.** Zeit. f. Augenh., 1930, v. 72, Nov., p. 384.

In the town of Minsk the incidence of myopia is higher in typesetters than in that part of the population not doing near work. There is also a proportion between progress of the disease and years of work as typesetter. The incidence is much greater among the Jewish than the non-Jewish Russians.

F. H. Haessler.

Schweinitz, G. E. de. **The heritage of sight; its conservation.** Jour. Missouri State Med. Assoc., 1930, v. 27, Oct., p. 469.

The author discusses the early history of the diseases which are largely responsible for blindness. He recommends that care of the Indians should be by the United States Public Health Service. Frequency of blindness from glaucoma can best be reduced by education of medical students and a thorough follow-up system by a social service department.

The author believes that the recent work by Derby on the light sense is going to prove valuable in detecting early cases of glaucoma. Efforts to prevent industrial accidents and injuries from Fourth of July celebrations should be unrelenting. Air rifles, darts, and toy pistols should be banished. Careful observation of injured eyes to catch sympathetic ophthalmia in the early stages is urged. Sight-saving classes should be encouraged. The establishment of an "institute for research in blindness and its prevention" is recommended. *Ralph W. Danielson.*

NEWS ITEMS

News items in this issue were received from Drs. C. A. Clapp, Baltimore; Gaylord C. Hall, Louisville; E. D. LeCompte, Salt Lake City; G. Oram Ring, Philadelphia; and George H. Shuman, Pittsburgh. News items should reach **Dr. Melville Black** by the sixth of the month.

Deaths

Dr. Benjamin H. Grove, Buffalo, aged seventy-one years, died March second of uremia.

Dr. Ira A. E. Lyons, Salt Lake City, aged eighty-two years, died March eleventh of cerebral hemorrhage.

Dr. Henry H. Briggs, Asheville, North Carolina, aged fifty-nine years, died February sixth of heart disease while at sea on the steamer "Duchess of Bedford."

Miscellaneous

Under the will of the late William A. Marbury, the Baltimore Eye, Ear, and Throat Hospital was left $2,500.

The National Committee for the Prevention of Blindness was left $2,500,000 by the will of Miss Ella Virginia Von Echtzel Wendel of New York.

Under the will of the late Miss Margaret E. Maund of Baltimore, the Maryland School for the Blind received $10,000 and the Presbyterian Eye, Ear, and Throat Charity Hospital $3,000.

The blind lawyer Thébault from the city of Rennes was a short time ago elected a member of the French Chambre des Députés. In this national assembly there is another blind member, Georges Scapini, also a lawyer, who was elected to his seat about two years ago. Both these men lost their sight in the war, and began and completed their study of law as blind men. (Outlook for the Blind, March, 1931.)

The forty-first international postgraduate course of the Vienna medical faculty will be held June 1 to 13, 1931, when the subject of "benign and malignant new formations with special reference to the early dignosis of cancer" will be dealt with by a number of professors, assistants, and docents. The secretary of the course is Dr. A. Kronfeld, Wien, IX, Porzellangasse 22, or application may be made to the office of the course at Wiener medizinische Fakultät, Wien, VIII, Schlösselgasse 22; the fee for the whole course being fifty Austrian shillings.

Societies

The Oxford Ophthalmological Congress will be held July 8 to 11, 1931. The usual arrangements have been made for accommodation in Keble College, Oxford, at very moderate charges. An address will be given by Professor G. Elliot-Smith, F.R.S., on "The evolution of the instruments of vision". Those who desire to contribute either papers or demonstrations are requested to notify the honorary secretary, C. G. Russ Wood, 12 Saint John's Hill, Shrewsbury, at their earliest convenience.

The following program was given by members of the staff of the Wilmer Institute at the recent meeting of the American College of Physicians: Dr. Alan Woods, "Syphilitic ocular lesion"; Dr. Jonas Friedenwald, "Ocular changes in disturbance of lipoid metabolism"; Dr. C. A. Clapp, "Modern conception of retinal detachment with its relation to internal medicine"; Dr. Leo J. Goldbach, "Fundus changes in leukemia"; Dr. A. L. MacLean, "Color fields as an aid in diagnosis of intracranial lesions"; Dr. Cecil Bagley, "Ocular findings in trichinosis"; Dr. Benjamin Rones, "The character of diabetic and renal exudates in the retina"; and Dr. R. T. Paton, "Clinical significance of choroidal tubercles".

The Section on Ophthalmology of the College of Physicians of Philadelphia met March nineteenth, when the following program was given: Dr. C. E. G. Shannon, "A case of bitemporal paracentral scotoma"; Drs. John and Chapin Carpenter, "Nonglaucomatous halos"; Dr. Max Trumper (by invitation) "The hazard of antifreeze methanol".

The Louisville Eye and Ear Society held its annual dinner at the Kentucky Hotel in January. Dr. Lawrence Post of Saint Louis was the guest of honor and addressed the members and guests on "The use of the thermophore in eye diseases".

Personals

Dr. Arthur J. Bedell of Albany (by invitation) gave an illustrated presentation before the Pittsburgh Ophthalmological Society on Monday evening, April 27, on the subject of "Medical ophthalmoscopy".

Dr. Henry N. Blum has been made head of the department of ophthalmology of the new medical school at Louisiana State University. The first two years of medicine will be conducted at the University in Baton Rouge; the last two, in New Orleans.

Dr. Thomas B. Holloway of Philadelphia delivered the Stewart Memorial Lecture of the Pittsburgh Academy of Medicine at the Academy auditorium on March 10, 1931. He spoke to the title "Concerning certain pathological conditions about the chiasm, with especial reference to pituitary adenomata".

Dr. John S. Plumer has been added to the ophthalmological staff of the Pittsburgh diagnostic clinic.